NATIONAL TRANSPORTATION SAFETY BOARD

PUBLIC HEARING IN CONNECTION WITH THE INVESTIGATION OF AIRCRAFT ACCIDENT KOREAN AIR FLIGHT 801, B-747-300 AGANA, GUAM AUGUST 6, 1997

Hawaii Convention Center
Ballroom A, B and C
1833 Kalakaua Avenue
Honolulu, Hawaii 96815

Tuesday, March 24, 1998
9:00 a.m.

Chairman, Board of Inquiry

THE HONORABLE ROBERT T. FRANCIS

Board of Inquiry

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Office of Aviation Safety

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Chief, Operational Factors Division
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MONTY MONTGOMERY
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Technical Panel

GREGORY FEITH
Investigator-in-Charge

PAUL MISENCIK
Operational Factors Investigator

MALCOLM BRENNER
Human Performance Investigator

GARY HAMMACK
Airport Crash/Fire/Rescue Investigator

GREGORY PHILLIPS
Aircraft Systems Investigator

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Public Information Officer

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General Counsel

DAVID BASS
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Parties to the Hearing

FEDERAL AVIATION ADMINISTRATION
Harold Donner, Spokesman

BOEING COMMERCIAL AIRPLANE GROUP
Kevin Darcy, Spokesman

KOREAN AIR COMPANY, LIMITED
Captain Sang Rok, Kim, Spokesman
First Officer Steven Chung, Official Assistant to Captain Kim

Parties to the Hearing(cont'd)

NATIONAL AIR TRAFFIC CONTROLLERS ASSOCIATION
Charles Mote, Spokesman

BARTON ATC INTERNATIONAL, INC.
Edward Montgomery, Spokesman

GOVERNMENT OF GUAM
Ron Dervish, Spokesman

A G E N D A

A G E N D A (cont'd)

P R O C E E D I N G S

9:00 a.m.

Opening Statement

CHAIRMAN FRANCIS: Good morning, everyone.

I'm Bob Francis. I'm vice chairman of the NTSB, and I'm chairing this hearing.

As you know, this is a hearing -- public hearing which is part of our process on an aircraft accident on August 6th, 1997, in Agana, Guam involving Korean Air Flight 801.

The purpose of the hearing is to supplement the factual record of this accident investigation for the NTSB. We thus have the NTSB witnesses, we have party witnesses, and we have some outside witnesses. All of these people have technical expertise to be able to bring to the factual portion of this investigation.

This hearing will not deal, I repeat, will not deal with any analysis of what happened nor will it deal with any causal issues. This is a factual hearing not dealing with analysis or cause.

There are five issues about which we'll be talking here today. The first is controlled-flight-into-terrain accidents and efforts on the part of the aviation community to deal with the controlled-flight-

into-terrain accidents.

The second is operation of navigational devices at the Guam airport.

The third is Minimum Safe Altitude Warning systems and practices related to this system at Guam and nationwide.

Fourth, rescue and recovery operations.

And fifth, governmental oversight of foreign air carriers operating into the United States.

Before I proceedfurther I'd like to introduce three people who are here. First is the congressman from Guam, Congressman Underwood, who is sitting over here at our observer table. Second, a member of the National Transportation Safety Board, John Hammerschmidt, and third, a colleague and member also, George Black. They're all sitting over here.

I'd like to take a minute and talk about controlled-flight-into-terrain. Controlled-flight-into-terrain or CFIT as it is called in the industry is the major killer of people on a worldwide basis in commercial aviation. This has been the case for some time, and there are no indications statistically that it is not continuing to be the case. It's an enormously, enormously important issue for those of us who are involved in the aviation safety business to be

dealing with, and it's something that I personally spend a great deal of my time working on and something that the industry I think is more and more focusing on as one of the real places where we can make gains in safety.

So, we'll be talking here about a number of issues that relate to controlled-flight-into-terrain. These include issues that can be dealt with by airlines, by air traffic control authorities, by equipment manufacturers. There are -- the entire community can be involved in this.

And I'd like to mention that the Flight Safety Foundation and a large portion of the international community have over the past five years or so been doing some very good work in this area. There's an educational package that's come out that's being distributed worldwide to airlines which is the kind of work that hopefully will be done by the community internationally and voluntarily to try to deal with this issue. But it's the kind of thing that -- that allows us to make gains in an area -- this particular area that's so important.

So, I think that -- that we should be focusing on this. We will be focusing on air traffic control, we will be focusing on training, we will be

focusing on airline cultures, we will be focusing on new technology which will hopefully let us deal with this issue. But I personally think that this is enormously important, and -- and I'm delighted that we're going to be spending so much time on it.

Let me conclude by one note here. We've had some confusion I think in communications in terms of dealing with the families and some of the people who were -- were survivors of the aircraft, and I think that we're going to make an effort to -- to do a better job with this communication. I'm going to meet with the families after -- after this meeting, and we will be giving them information on how they can communicate with us more directly because we have had some problems in the past and -- and I'm sorry that that was the case.

Let me now introduce Ron Schleede, who is the hearing officer, and he will introduce a number of the people who are going to be key to this hearing.

Introduction of the Board of Inquiry

MR. SCHLEEDE: Thank you, Mr. Chairman. Thank you.

My name is Ron Schleede. I'm a deputy director, Office of Aviation Safety for International Affairs.

The Board of Inquiry up here, I have with me Mr. Monty Montgomery, chief of our Information Technology Division, Office of Research and Engineering.

To my far right, that's Mr. Pat Cariseo, safety specialist in the Office of Safety Recommendations.

To his left is Mr. Ben Berman, chief, Operational Factors Division.

There's other NTSB staff here today sitting in that location and this location. First, we have John Clark, deputy director of Office of Aviation Safety for Investigations and Technical Matters.

We have three public affairs officers here. Mr. Paul Schlamm, Keith Holloway, and Ted Lopatkiewicz.

The report-writer for this case, Mr. Gerard Stichen.

Behind us we have Ms. Denise Daniels, special counsel to the vice chairman; Ms. Maria Sturniolo, confidential assistant to the vice chairman; and David Bass, chief counsel -- or deputy chief counsel for the NTSB.

From our Office of Government Affairs we have Ms. Betty Scott. From the Office of Family Affairs, Elizabeth Cotham and Matt Furman. We also have Ms.

Alice Park with us today from the NTSB Office of Research and Engineering. She is providing interpreting services for us.

For administrative matters and logistics regarding this hearing, we have three people seated over here to the left, Ms. Carolyn Dargan, Candi Wiseman, and Ann -- I forget the last name. Sorry, Ann.

All these people are available to assist during any part of the hearing. If you have questions please approach one of them.

Introduction of the Parties to the Hearing

MR. SCHLEEDE: I'd like now to switch to the people in front of us and ask the party spokesman, as I call each party, to identify their -- their name and their title, beginning with the Federal Aviation Administration.

MR. DONNER: Yeah, Mr. Chairman, my name is Bud Donner. I'm the manager of the Accident Investigation Division, Federal Aviation Administration.

MR. SCHLEEDE: Thank you.

Boeing Commercial Airplane Company?

MR. DARCY: The name is Kevin Darcy, and I'm chief investigator, Air Safety Investigation.

MR. SCHLEEDE: Thank you.

Korean Air Company, Limited?

CAPTAIN KIM: Sang Rok Kim, deputy director, Safety and Security Department.

MR. SCHLEEDE: Thank you, Captain Kim.

National Air Traffic Controllers Association?

MR. MOTE: Good morning, Mr. Schleede and Mr. Chairman. My name is Charles R. Mote. I'm a senior safety investigator with NATCA and air traffic control specialist.

MR. SCHLEEDE: Barton ATC International?

MR. E. MONTGOMERY: Good morning. My name is Ed Montgomery. I'm the president of Barton ATC.

MR. SCHLEEDE: And the Government of Guam?

MR. DERVISH: Good morning. My name is Ron Dervish. I'm the deputy chief of police, Guam Police Department and spokesman for the Government of Guam.

MR. SCHLEEDE: Thank you, Mr. Dervish.

And now I'd like to turn to the Civil Aviation Bureau of Korea spokesman, please. Please state your name and title.

MR. LEE: (responds in Korean)

MR. SCHLEEDE: And also at that table is Mr. Ham, who is the designated accredited representative for the Government of -- of Korea during the on-scene

investigation.

I'd like to mention that the KCAB is representing the Government of Korea as part of this investigation in accordance with the provisions of the convention on International Civil Aviation and Annex 13 to that convention. Annex 13 provides certain rights and obligations on the state of registry of an airline when it crashes in another country. This investigation has been conducted in full compliance with the spirit of cooperation intended by Annex 13. I want to thank publicly our colleagues from the KCAB for their assistance in this investigation.

Introduction of the Technical Panel

MR. SCHLEEDE: The Board of Inquiry will be assisted by a Technical Panel of specialists from the NTSB, led by Mr. Greg Feith, the investigator-in-charge. I'd like Mr. Feith to now introduce the Technical Panel.

MR. FEITH: Thank you, Mr. Schleede.

With us at the Technical Panel is Mr. Charles Pereira. He is an aircraft performance specialist in the Office of Research and Engineering. He did the aircraft performance study for this accident.

Sitting to his left is Mr. Scott Dunham. He is a air traffic control specialist in the Office of

Aviation Safety.

Sitting next to Mr. Dunham is Mr. Richard Wentworth. He is a national resource specialist for air traffic control in the Office of Aviation Safety, both of whom have done extensive work on this investigation.

At our back table sitting directly behind me is Mr. Paul Misencik, Captain Misencik. He was the operations group chairman for this investigation.

Sitting to his left is Mr. Malcolm Brenner -- Dr. Malcolm Brenner, who did the human performance aspect of the investigation in conjunction with the operations group.

Sitting next to Dr. Brenner is Mr. Greg Phillips. He did the aircraft systems portion of the investigation and also did the aircraft structures. Our aircraft structures specialist is not present today, and so, Greg will discuss any structural questions if they do arise.

And then sitting next to Mr. Phillips is Mr. Gary Hammack, and he will be addressing the crash/fire or search/fire/rescue aspects of this investigation.

CHAIRMAN FRANCIS: Let me introduce one other extraordinarily important person here, Teddy Brown, who makes certain that we can all communicate one with

another in this room. He works for us with the NTSB in Washington.

Now I'd ask Greg Feith, the investigator-in-charge, he's got a prepared statement to come as -- as the first witness.

Description of the Investigation by Mr. Feith

MR. FEITH: Good morning, Mr. Chairman, Board of Inquiry, colleagues on the Technical Panel, parties, ladies and gentlemen.

On August 6th, 1997, about 01:42 Guam time a Korean-registered Boeing 747-300 operated by Korean Air Company, Limited as Korean Air Flight 801 crashed about three nautical miles southwest of the Guam International Airport in Agana, Guam while executing the ILS approach or Instrument Landing Systems approach to runway 6-left.

The Safety Board was notified of this accident on August 5th about 12 noon Eastern Daylight time. I was assigned as the investigator-in-charge. The go-team assembled at Andrews Air Force Base in Maryland and departed later that evening via United States Air Force C141 transport aircraft to Fairchild Air Force Base in Washington state. The trip to Guam was subsequently completed on a KC 135R, and the team arrived in Guam about 8:30 in the morning Guam time on

August 7th.

The Board member on duty at the time was George Black, and he accompanied the team to the crash site.

The investigative team consisted of various specialists from the Safety Board's headquarters, the south central region, and southwestern regional offices. The specialty areas were aircraft operations, human performance, aircraft systems, structures, power plants, maintenance records, air traffic control, survival factors, aircraft performance, meteorology, and search/fire/rescue. There were also specialists assigned to conduct the read-out of the flight data recorder and to transcribe the cockpit voice recorder in the Safety Board's laboratory in Washington, D.C.

With regard to the CVR, the initial CVR -- transcript was produced in English by the initial group members that convened in Washington. The CVR group then later reconvened and produced a more --

CHAIRMAN FRANCIS: Greg -- Greg, what we're doing in simultaneous interpretation here so you're going to have to go a little slower --

MR. FEITH: Okay.

CHAIRMAN FRANCIS: -- those ladies back there are going to be in trouble.

MR. FEITH: Okay. The initial CVR transcript was produced in English by the group. However, the CVR then reconvened and produced a more detailed and -- and detailed transcript in both English and Korean languages.

The following organizations were given party status and provided technical assistance to the Board: the Federal Aviation Administration; Korean Air Company, Limited; Boeing Commercial Airplane Company; Pratt-Whitney Engines; the National Air Traffic Controllers Association; the United States Navy; and emergency response personnel from Guam.

In addition, Mr. Ham of the Korean Civil Aviation Bureau was designated as the accredited representative and the leader of the Korean delegation in accordance with the provisions of Annex 13 to the Convention on International Civil Aviation.

Further, two air safety investigators from the Australian Bureau of Air Safety Investigations, or BASI as they're more commonly known, participated in the investigation as technical observers.

Now, to give you a brief history of flight. Korean Air Flight 801 was a regularly scheduled passenger flight that departed Kimpo Airport in Seoul, Korea at 21:53 or approximately 9:53 in the evening.

The -- the flight itself proceeded uneventfully en route to Guam. An audio examination of the CVR revealed that the captain was what we call the flying pilot and that the first officer was performing the radio communications and those duties required of the non-flying pilot at the time of the accident.

At 01:03 the first officer contacted the Guam Air Traffic Control Center and Radar Approach Control, or more commonly known as CERAP, and stated that they were at flight level 410 or 41,000 feet over Nimitz Intersection, which is a reference point -- a navigation reference point located about 240 nautical miles northwest of the VOR -- Nimitz VOR which is in close proximity to Guam International Airport.

About 01:11:51 the CVR recorded the captain briefing the other flight crew members about the approach to Guam. The captain stated in part, quote, "I will give you a short briefing. Since the visibility is six miles, when we are in visual approach, as I said before, set the VOR on number two and maintain the VOR for the top of descent. In the case of a go-around, since it is VFR while staying visual and turning to the right request a radar vector. Since the localizer glide slope is out, the minimum descent altitude is 560 feet and the height above

touchdown is 304 feet."

At the conclusion of this briefing, a short time later at 01:22, the Guam CERAP controller informed Flight 801 that the Automatic Terminal Information Service or ATIS report, which is a prerecorded report of the weather conditions at Guam were as follows: that the current weather was uniform and that the current altimeter setting was 29.86.

The first officer acknowledged the transmission and said, "Checking uniform." However, he did not acknowledge the altimeter setting.

About two minutes later Flight 801 began deviating around cumulo-nimbus clouds that were scattered along their route of flight. About six minutes later the first officer reported to the Guam CERAP controller that they had cleared the weather and requested radar vectors to runway 6-left.

At -- at 01:31 the CERAP controller provided radar vectors to Flight 801, and approximately seven minutes later the controller transmitted, quote, "Korean Air 801 turn left heading 090. Join the localizer." The first officer acknowledged this transmission.

About eight minutes later the CERAP controller transmitted, quote, "Korean Air 801 cleared

for the ILS runway 6-left. Glide slope unusable." The first officer responded, "Korean 801, roger. Cleared ILS runway 6-left." However, the first officer did not acknowledge the glide slope was unusable.

Shortly after being cleared for the ILS approach, the CVR recorded the flight engineer saying, quote, "Is the glide slope working?" to which the captain responded, "Yes, yes. It's working."

At 01:39:58 the CVR recorded an unidentified flight crew member say, "Check the glide slope if working," followed by "Why is it working?"

The first officer responded, quote, "Not usable."

About 23 seconds later, the CVR recorded an unidentified flight crew member say, "Glide slope is incorrect."

At 01:40 the first officer stated that they were approaching an altitude of 1400 feet. The captain responded, quote, "Since today's glide slope condition is not good we need to maintain 1440. Please set it."

Approximately 20 later -- 20 seconds later, the sound of the altitude alert, which is an alert in the cockpit with a predetermined altitude set in, was recorded on the CVR.

At 01:41 and 14 seconds, the controller cleared Flight 801 to land on runway 6-left. The first officer acknowledged the clearance and the crew began to reconfigure the airplane for landing.

About 01:41 and 42 seconds the CVR recorded the ground proximity warning announcing 1000 feet and the captain beginning a checklist item saying, "No flags, gear, flaps."

About four seconds later the captain said, "Isn't glide slope working?" There was no response to this statement by the captain.

The crew continued to complete the landing checklist items, and at 01:42 the CVR recorded the ground proximity warning system announcing, quote, "Minimums" followed by "sink rate." This announcement was followed shortly thereafter by the first officer saying, quote, "Sink rate okay," and the flight engineer announcing, "200 feet."

At 01:42:19 the first officer said, quote, "Let's make a missed approach," and the flight engineer said, quote, "Not in sight, missed approach."

These two comments were followed immediately thereafter by both the first officer and the flight engineer saying, quote, "Go around."

Approximately one second later the CVR recorded the sound of the auto-pilot disconnect chime and the altitude announcements on the GPWS or Ground Proximity Warning System.

The sound of the airplane impacting the ground were recorded by the CVR at 01:42 and 26 seconds.

The published -- excuse me. The published approach procedure for the ILS to runway 6-left with the glide slope inoperative depicts a series of step-down altitudes that the pilot is required to maintain during the execution of the approach. What you will see is the step-down altitudes which will ensure sufficient terrain and obstacle clearance.

(Slide)

MR. FEITH: Unfortunately, I don't have a pointer, but if you'll look at --

(Pause)

MR. FEITH: In this box right here is a profile view of the approach where this being 2600 feet will be the initial intercept altitude. There is a step-down to an altitude of 2000 feet with another step-down to 1440 feet and then a final step-down to the minimum descent altitude of 560 feet.

These step-down altitudes ensure that the pilot will maintain an obstacle and terrain clearance during this portion of the approach.

(Slide)

MR. FEITH: The lowest altitude for the first segment is 2000 feet until 1.6 nautical miles, so the aircraft would be at 2000 feet until this point right here. This would be followed by a step-down to 1440 feet until crossing the VOR.

(Slide)

MR. FEITH: And then stepping down to the final MDA of 560 feet.

If visual contact with the airport does not occur within the 2.8 miles after crossing the VOR or visual contact cannot be made, the pilot must execute a missed approach.

According to the data recorded by the flight data recorder Flight 801 began to descend from 2600 feet when the airplane was about five miles from the VOR or about 8.5 miles from the airport. The flight data recorder and radar data indicated that Flight 801 had been descending at a rate of approximately 950 feet per minute and continued at this rate through the intermediate altitudes of 2000 and 1440 feet. The airplane struck the rising mountainous terrain about

one-tenth of a mile west of the VOR.

And at this time, Mr. Chairman, I think that because this is a bit complicated we do have a video depiction which will show both a plan view and a profile view of the aircraft as it traversed the terrain, and this information is based on the flight data recorder and radar data that was collected during the course of the on-scene investigation, and I'd like to show that now.

CHAIRMAN FRANCIS: That's very helpful. Let's do that.

(Mr. Feith narrates the scenes from the video.)

MR. FEITH: What we're going to see -- and this video is approximately 10 minutes long. The first part of the video itself will be a -- a still or just a picture of the terrain in the area of Agana Airport in Guam. And then you will see a profile plan. And what you have is the terrain looking down on Guam. Here is Agana, Guam International Airport, runway 6, the coastline.

This is the middle marker, which is one of the navigational aids that is part of the Instrument Landing System Approach.

This is the VOR that we've been referencing. It sits up on Nimitz Hill, and it is also an integral part of the Instrument Approach Landing System approach for this runway. And then the outer marker, which is also another navigational point for the ILS approach.

Flake Intersection is a navigational reference point at which the airplane will initially intercept the localizer, which in this case because the glide slope portion which provides the pilot with a vertical guidance to the runway was out of service, the only navigational aid associated with the ILS on this particular night was the localizer which provides lateral guidance to the pilots. So, the lateral guidance would keep it within this -- these two lines -- this band to the runway.

In the profile you see depicted here the step-down altitudes as they are depicted on the approach procedure for this runway. And again, this is a terrain profile. You have nautical miles across the bottom to the airport. You have altitude in feet above sea level, not above the ground.

And you will see in this animation the airplane as it begins its trek into the localizer flight path and then proceeds towards the airport. At the same time, you will see what it is doing in the

vertical and you will watch the airplane as it comes through the various altitudes on its flight profile all the way to the impact point.

All of this information was derived from radar data that was accumulated and the flight data recorder data from the aircraft. So, what you're seeing is the actual profile of what the airplane did prior to the accident.

The CVR text will be depicted right in the middle, and what we've done so that you can read it because it starts to scroll pretty quickly is that you'll see this played in half-speed so it will not be real time so that you can read the CVR data. We then played -- replayed the -- the animation again at regular speed or full speed so that you will be able to see it in real time. But you will have had an idea of what was transpiring in the cockpit with the flight crew during the -- during the flight path demonstration.

CHAIRMAN FRANCIS: Could -- could we stop for just a second? We're going to show this animation, and -- and I would just say to those here, particularly family members, this is not -- this -- this shows the -- the actual flight of the aircraft. It's possible that -- that you could find this disturbing, and if you

would like we'll leave a second here if you'd like to go out of the room while we do this.

(Pause)

CHAIRMAN FRANCIS: Okay. Go ahead.

MR. FEITH: You'll see the airplane entering the picture. And again, this is looking down on the airplane as the airplane is beginning its intercept of the localizer. It'll join the localizer and then begin a trek towards the airport. At the same time the airplane has entered the picture up here in the left corner and is tracking along this altitude line of 2600 feet. And as you can see from the note that they will remain at 2600 feet or should remain at 2600 feet until passing the Flake intersection, this point right here. And you will see where they intercept, which is just inside of Flake.

(Pause)

MR. FEITH: Now, again, because of -- excuse me. Because of the information that would be necessary such as you see here for this demonstration, terrain information is not typically depicted on approach plates. So, this information has been derived off of topographic maps and is in pretty much of a -- a direct relationship to the flight path and its relative position to the airport. But again, we're talking in

an expanded vertical scale so that you can see the actual movement of the aircraft.

And as you can see right here, the airplane has passed Flake intersection in both views and will then begin the descent because they've now been cleared for the ILS approach.

(Pause)

MR. FEITH: One of the things that we found during the course of the investigation was that although the weather conditions were reported as VFR or visual there were some areas of thunderstorm build-up around the airport area and included a thunderstorm build-up off the approach-end of the runway, which the aircraft did in fact fly into because on the CVR we do hear the sound of the windshield wipers on the aircraft being turned on. And so, we know that the aircraft had flown into a rain event. And I will talk briefly about that later on.

But you see the -- the airplane will now begin a descent. These are intermediate altitudes of 2000 feet, 1440 feet, and then on down to 560 feet once the high terrain is cleared, and that would be the altitude that the aircraft would remain at until the pilots had a visual cue on the airport and then would make a normal landing.

(Pause)

MR. FEITH: Again, they referenced a 1440. The airplane is on its way down.

(Pause)

MR. FEITH: Another integral part of this approach is the VOR, and the reason it is critical is because the captain would typically fly with his navigation instruments set for the localizer. So he would be tracking the lateral guidance while the first officer would typically be monitoring the distance-measuring equipment on board that reads off the mileage from the station digitally. And so, he would be monitoring the digital countdown because you're counting down from seven nautical miles at Flake intersection to zero at the VOR. Then you would -- once passing the VOR would begin your count back up to 2.8 to the runway.

As you see, as the airplane continues its trek now over land the airplane has gone through the 2000-foot altitude and continues on a steady state descent down to 1440.

Typically, the airplane would fly -- now, this MSAW alert that you just saw flash right here, this is the Minimum Safe Altitude Warning system that the FAA has. It is a system that works in conjunction

with the radar at this airport and other airports around the nation, United States.

And what we have demonstrated here is that if the system, which we will talk about and we will have witnesses addressing later on, had been working as it was intended, the controllers would have had a Minimum Safe Altitude Warning alert right here when the airplane exceeded this 2000-foot step-down at the 1700-foot level. However, because the system did not work as designed the controllers did not receive the MSAW alert and that information was not forwarded to the crew while they were doing the approach.

As you see, the airplane continues in a steady state descent as it's approaching the outer marker. And again, it has gone through the intermediate altitude of 1440 feet.

The crew is going through checklist items. The first officer, which is the Cam-2 position, does not see the -- what we believe is the runway, says "not in sight." They're continuing their checklist items.

(Pause)

MR. FEITH: You can see that the GPS is starting to call the sink rate and the minimums. However, the first officer says that the sink rate is okay.

There's the 200-foot call. They don't see the airport. They're in the process of going around.

Disconnect. That is the countdown between the airplane and -- and ground. And the airplane impacts the hill in the vicinity of the VOR.

(Pause)

MR. FEITH: And as you will see now, the -- the real time animation will run at a quite a bit faster speed.

(Pause)

MR. FEITH: Okay. Again, you have the airplane entering the picture, both at altitude and then over the water as it intercepts the localizer.

(Pause)

MR. FEITH: Had the glide slope portion of the ILS been working -- the glide slope projects an invisible radio beam at about a three degree angle projected upward, which once the airplane intercepts that glide slope electronically, the flight crew then would follow its instruments. As long as the airplane was on the glide slope it would bring it down to the runway at a -- at a -- approximately three-degree angle, which would clear all of this terrain.

But because the glide slope was inoperative, there is a different set of minimums, altitudes that

the -- the flight crew must follow, a different set of procedures, which is this step-down so that they can systematically fly over this area of high terrain. But it is critical that these navigational aids be used as a gauge when crossing this area of high terrain during the course of the approach.

And as I had briefly spoke in the earlier part of my statement, there was a -- a discussion amongst the flight crew members about the glide slope. Although the glide slope had been NOTAM'd, and that is Notice to Air Men. It's a piece of information put out by the FAA that the glide slope was out of service. There was still some question by the flight crew as they were proceeding on the approach about the operational status of the glide slope. And because of that, that is one of the issues that the Safety Board Operations and Human Performance group has looked into with regard to why the crew would have been questioning that given the fact that it was in fact inoperative.

And you see the MSAW alert flashing. This would be typically where we would have expected the controller to have received the MSAW alert that the airplane had gone through this 2000-foot altitude which it should have been at, and they would have then provided a low altitude warning alert to the crew.

(Pause)

MR. FEITH: A couple other notes about this particular area. In talking to pilots that fly into this area quite a bit, especially at night, this is what we call a -- a black hole. That is, the terrain around here is such that there are no lights as you would typically see looking out the window here in Honolulu with all the lights of the building. To contrast that, there are very few if any lights in this area and you cannot really distinguish the terrain from the black of night, so it looks like a black hole.

All of these things are considerations that the Human Factors and Operations group had to look at during the course of their investigation, and that is just parts of their investigative process with -- with regard to the crew and the operation of this airplane.

(End of video)

MR. FEITH: Hopefully you have a little better idea now of what the aircraft was doing. You do have some sense of what the flight crew was doing at various times during the course of the approach.

The investigation is a very complex process. There are a lot of aspects that need to be looked at. And while this public hearing tends to focus on five of the issues that the chairman has discussed, I'd just

like to give you a little bit of information on some of the other things that -- that we are looking at and some information that we've revealed thus far during the course of the investigation.

To begin, the captain had been a pilot in the Korean Air Force prior to his employment with Korean Air in November 1987. During his tenure with the airline he flew the Boeing 727 and the Boeing 747. He had accumulated about 9000 hours of total flight time with 3000 hours in the Boeing 747 and about 1700 as a captain in the 747.

According to company records the captain had operated a Boeing 727 into Guam for approximately one year back in 1993. There were no other records of him flying into Guam until he received video familiarization for operations into Guam and a line experience trip or a line trip into Guam which occurred on July 4th, 1997. This operation was conducted in a Boeing 747. It was done at night in VFR conditions.

The first officer was also a pilot in the Korean Air Force prior to his employment with Korean Air in 1994. He had accumulated about 4000 hours of total time and about 1500 hours as a first officer in the 747. The first officer received his familiarization training for operations into Guam on

July 8th, 1997, and had previously operated into Guam in the 747 back in 1995.

The flight engineer had been a navigator in the Korean Air Force prior to his employment with Korean Air in May of 1979. He had flown as an engineer on the Boeing 727, the Air Bus A300, and the Boeing 747. He had approximately 13,000 hours of total flying time, of which 11,000 was over a period as a civilian flight engineer.

Several issues that we have looked at as the investigative team include the development of the -- an issue that was developed during the course of the investigation evolved from the operational status, as I mentioned, of the glide slope portion of the Instrument Landing System. On August 6th the glide slope portion of the ILS was out of service and only the localizer was available. Because of the comments that the crew had made regarding the operational status as you saw during the course of the animation, the discussion that they had regarding the operational status of the glide slope, we became concerned what may have caused them to have this discussion.

One of the aspects that we're looking at is what we call spurious signals or radio signals that may have influenced the navigation equipment on the

airplane. That is an aspect that our aircraft systems group is currently looking into.

The investigative team also examined the weather conditions as I had said earlier. At the time of the accident the reported conditions at the airport were generally good with light winds from the east. Visibility was about seven miles in a rain shower, and there were broken clouds. However, based on data that we were able to obtain from Doppler radar, from satellite imaging, and from witnesses, we found that there was a thunderstorm on the approach end of the airport at the time that the airplane -- that Flight 801 had been traversing through and that this thunderstorm was of -- was capable of producing heavy rain and gusty winds and reduced visibility. We are also looking at that and -- from an aspect of what that may have done to influence the crew in their decision-making.

The en route and approach radar positions at Guam are typically performed by one controller using two independent radar systems. And as I had mentioned earlier, that's what we characterize or call the CERAP. Both systems are equipped -- that is, the radar systems are equipped with a Minimum Safe Altitude Warning system, as I pointed out, with the alert that

you saw in the demonstration and that when the airplane exceeded the minimum altitudes or a predetermined altitude the controller would typically get this warning.

We want to know why the system was not working as it was intended. That is one of the focal points of this investigation. And we will have witnesses that will be testifying to this issue later on in the hearing.

The Safety Board also found during the investigation that the post-accident emergency response to the accident site was delayed several minutes because the air traffic -- because the air traffic controller was not immediately aware that Flight 801 had crashed off the airport.

In addition, emergency response vehicles were delayed in arriving on the scene because access to the accident site was initially stopped by a fenced gate around the property where the airplane had crashed and then further hampered by a narrow paved road which was blocked by some emergency vehicles that were disabled thus preventing the fire trucks from getting close -- into close proximity to the accident site itself.

Again, we will have witnesses that will be talking to these issues later on in this hearing.

In addition to this, the Safety Board will also be examining several other issues, including the crew's training at Korean Airlines, crew resource management or how the crew works together, and instrument approach procedures and charting. Is there a way to look at these approach procedures that the crew must follow during periods of -- of bad weather or reduced visibility that will give them better information so that we will not have what the chairman has talked about, and that is controlled-flight-into-terrain type accidents.

Although the Safety Board investigative team completed the on-site wreckage examination August 28th, 1997, several other investigative activities have either been completed or are ongoing. These in -- activities involve the examination and tear-down of various electronic components, as I referenced earlier, the navigation equipment. These activities involve the study of aircraft performance, the follow-up on the MSAW system, and of course, the detection of spurious signals in the area around Guam.

In addition to the investigative activities, a meeting was convened in Guam back in January of 1998 and was attended by all of the parties. The purpose of this meeting was to review the progress of the

investigation thus far, to review all of the reports that have been produced by the National Transportation Safety Board group chairman thus far, and then to determine future work items that are necessary as far as the investigation process is concerned. Since this meeting, all of the parties and the KCAB have reviewed the factual reports and their comments have either been addressed or incorporated into the respective reports.

The issues stated by the chairman in his opening remarks and those described briefly in this statement will be addressed by witnesses that were selected based on their expertise, their extensive knowledge, or -- excuse me, or their experience as they relate to the subjects and the issues. Their testimony will provide additional factual information which the Safety Board will use in its analysis of this accident and its determination of the probable cause.

And before I conclude, Mr. Chairman, I would just like to take a moment to publicly thank some people and some organizations. First, Mr. Ham and the Korean delegation for their continuing support and assistance in the investigative process. It's been a -- a very difficult situation, especially because of the distance that we need to communicate, but we've been able to coordinate our activities and our efforts, and

it's worked out thus far.

I'd also like to thank my colleagues here at the Board, the investigators that worked very diligently under very stressful conditions to get the work done in very short order given the fact that, unfortunately, we've had numerous accidents of recent late and we were all pulling double duty.

I'd also like to thank the U.S. Air Force for giving us transport to the accident site and the Navy for their cooperation and the logistical support while we were at the accident site.

And I'd also like to thank the officials and the citizens of Guam who extended the team while we were on-scene for almost a month for their generosity and their hospitality. We were -- we were treated very well there, and people pitched in and volunteered a lot of service to us and we do appreciate them.

Mr. Chairman, this concludes my remarks. The -- the record of investigation is contained in the documents in our public docket, and the court reporter has been provided a list of such materials.

CHAIRMAN FRANCIS: Thank you, Mr. Feith.

We will now go ahead and call our first witness, who is Mr. Kurt Mayo, approach controller, FAA, Guam CERAP.

Whereupon,

KURT MAYO

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

KURT MAYO

APPROACH CONTROLLER

FEDERAL AVIATION ADMINISTRATION

GUAM CERAP

MR. SCHLEEDE: Mr. Mayo, please state your full name and business address for our record.

THE WITNESS: My name is Kurt Mayo. My business address is Guam CERAP, Anderson Air Force Base, Guam, Building 18011.

MR. SCHLEEDE: And by whom are you employed?

THE WITNESS: I work for the Federal Aviation Administration.

MR. SCHLEEDE: Okay. And what is your position at the --

THE WITNESS: I'm an air -- I'm an air traffic control specialist.

MR. SCHLEEDE: And how long have you worked as air traffic specialist?

THE WITNESS: 19 and a half years.

MR. SCHLEEDE: Could you provide us a brief summary of your training and experience that qualifies you for your present position?

THE WITNESS: I started my career as an air traffic controller in 1978 with the United States Navy. I was assigned to the Naval Air Station, Cubie Point in the Philippines where I was qualified as a full performance level controller in the radar approach control as well as the control tower. I was also qualified as the facility watch supervisor. I worked there for three and a half years.

I began my career with the Federal Aviation Administration as an air traffic controller in 1982. I was assigned to the Los Angeles Terminal Radar Approach Control where I was a full performance level controller. I worked for the Los Angeles TRACON from May 1982 until February 1994, at which time we relocated our office to San Diego, California to the Southern California Terminal Radar Approach Control.

I worked in the Southern California TRACON from February 1994 until September 1995 in the Los Angeles area as a full performance level air traffic controller.

In September 1995 I transferred to the Guam Center Radar Approach Control where I currently work as a full performance level controller until this day.

MR. SCHLEEDE: Thank you very much, Mr. Mayo. Mr. Wentworth will proceed with the questioning.

MR. WENTWORTH: Thank you, Mr. Schleede.

Good morning, Mr. Mayo. Thank you for coming.

THE WITNESS: Good morning.

MR. WENTWORTH: Mr. Mayo, are you currently certified -- medically certified as a controller?

THE WITNESS: Yes, sir. I am.

MR. WENTWORTH: Okay. Do you have any waivers or limitations?

THE WITNESS: No, sir. I do not.

MR. WENTWORTH: And when was your last medical?

THE WITNESS: In December of 1997.

MR. WENTWORTH: Thank you.

Okay. Teddy, 3D, please?

And would you go to 3D also, Mr. Mayo, please?

(Pause)

MR. WENTWORTH: And this is a layout of the radar approach control.

(Pause)

MR. WENTWORTH: Mr. Mayo, if you'd just look at the very top of the view there. Would you please show us where you were operating and would you explain the radar systems that you had to -- to work with there?

THE WITNESS: I was working at the R4 position here in front of the long-range radar scope. Directly to my right is the ASR radar scope, approximately one foot to my right. To my left is the D3 position where I have the teletype printer, flight progress strips, and this is the position where I normally answer land-line calls.

MR. WENTWORTH: Okay, sir. And where -- was the other associate at that particular time you were on duty? Was he out of the room?

THE WITNESS: Yes, sir. He was.

MR. WENTWORTH: And how would you have been expected to reach him if you needed him?

THE WITNESS: I would call him on the intercom telephone.

MR. WENTWORTH: And where was that located?

THE WITNESS: Here on the supervisor's desk behind me approximately eight feet.

MR. WENTWORTH: Okay. Did you receive or take any telephone calls while you were on duty prior to the accident?

THE WITNESS: You're referring to non-business-related calls?

MR. WENTWORTH: Yes, that's correct.

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: Or anything to do with the phone on the supervisor's desk which would have taken you away from the operation?

THE WITNESS: No, sir. I do not recall receiving any phone calls from the telephone on the supervisor's desk.

MR. WENTWORTH: Thank you.

Thank you, Teddy.

Now, when you came on duty could you tell us what was not functional while you were working?

THE WITNESS: The primary radaon the long-range radar system was out of service, and the glide slope portion of the ILS was out of service.

MR. WENTWORTH: And the impact of not having the primary, did that have anything to do with your being able to depict weather?

THE WITNESS: Yes, there was no weather depicted on the long-range radar system.

MR. WENTWORTH: However, it would have been depicted on the ASR 8?

THE WITNESS: Yes, sir, which I normally set at a 60-mile range and the long-range radar set for a 250-mile range.

MR. WENTWORTH: Was a staffing complement of two controllers on duty that morning? To your knowledge, was that a standard staffing level?

THE WITNESS: Yes, sir. It was.

MR. WENTWORTH: Now, based on your knowledge of the weather that prevailed throughout the area that morning, is that -- were those weather conditions pretty standard or -- for that time of the season or that time of the year?

THE WITNESS: Yes. During that time of the year we have frequent rain showers in the area ranging from light rain showers to heavy thunderstorms.

MR. WENTWORTH: And based on the fact that the glide slope was out of service you advised the crew that it was unusable. Is this terms relevant to air traffic control phraseology?

THE WITNESS: Yes, sir. I used the phrase exactly out of our handbook. "Glide path or glide slope unusable."

MR. WENTWORTH: In your view, did the crew acknowledge the fact that it was unusable?

THE WITNESS: Yes, sir. The pilot acknowledged my clearance by the use of the word "Roger" in addition to a partial read back of the clearance.

MR. WENTWORTH: To your knowledge, is there any requirement for you to receive every word of a clearance that you issued to a flight crew?

THE WITNESS: I must ensure that the pilot acknowledges my clearance and the pilot make acknowledge of the clearance by use of terms such as "Roger," "Wilco," "Affirmative," or other words or phrases.

MR. WENTWORTH: But if he does not parrot it back to you, in other words, speak every particular phrase that you issued and does in fact give a -- a reply with a "Roger" or the aircraft call sign or something of that nature, does that indeed constitute acknowledgement?

THE WITNESS: The word "Roger" it -- in and of itself according to our handbook means that the pilot received and understood my last clearance in its entirety.

MR. WENTWORTH: Mr. Mayo, prior to this accident did you or your colleague receive any pilot reports of any NAV/AID difficulties or outages?

THE WITNESS: No, sir. We did not.

MR. WENTWORTH: To your knowledge, did any other aircraft execute the ILS to runway 6-left and safely land?

THE WITNESS: I do not recall at this time aircraft executing an ILS prior to the Korean Airlines. The most -- closest previous arrival was 35 minutes earlier, and the aircraft executed visual approach.

MR. WENTWORTH: Now, you relieved a colleague at that position. If he had received a report of difficulties with that particular approach would he have been required to advise you of such?

THE WITNESS: Yes, sir. He would have been.

MR. WENTWORTH: And I take it that he did not?

THE WITNESS: No, I did not receive any briefing to that effect.

MR. WENTWORTH: Thank you. Are any of the NAV/AIDs that serve the Guam International Airport monitored by your facility?

THE WITNESS: In our radar room we only monitor the VOR or the VORTAC.

MR. WENTWORTH: And if an alarm occurs is there a way in which you would receive it?

THE WITNESS: The monitor provides an oral and a visual alert. Yes, sir.

MR. WENTWORTH: And during the period that you were on duty did you receive any such alarms?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: Moving to the approach clearance that was issued to Korean Air 801, is there specific information which must be issued to the crew when he's cleared for a specific instrument approach procedure such as the ILS?

THE WITNESS: Generally speaking, the elements of the clearance are aircraft call sign, aircraft position, perhaps a vector, an altitude to maintain -- until established on the final approach course, and then any appropriate remarks -- including the approach clearance.

MR. WENTWORTH: And would you explain for us on the long-range radar are any of the elements of the ILS to runway 6-left at Guam depicted, such as the outer marker or the extended center line for the runway?

THE WITNESS: We have a map that we can display on the long-range radar. At the time it was

not displayed on the long-range radar.

MR. WENTWORTH: Would it have been displayed on the ASR 8?

THE WITNESS: Yes, it was.

MR. WENTWORTH: It was, sir?

THE WITNESS: Yes, it was, sir.

MR. WENTWORTH: Okay. Can you tell me what the purpose or rather how the extended center line is depicted, first of all?

THE WITNESS: The extended runway center line or the final approach course is an extension of the runway out to approximately 12 miles from the airport depicted by dashed lines in one-mile increments.

MR. WENTWORTH: Now, based on the clearance that was issued to Korean Air 801, it's noted that they were not issued an altitude to maintain. Can you tell us why that might have occurred?

THE WITNESS: I observed the aircraft established on a segment of the approach at the assigned altitude and I thought it would have been redundant.

MR. WENTWORTH: We also noted that the crew was not given their position relative to the outer marker. Can you tell us why that occurred?

THE WITNESS: No sure -- no, sir. I should have given them their position.

MR. WENTWORTH: At what point did you transition from the long-range radar to the ASR 8 in determining the position of Korean Air 801?

THE WITNESS: Well, I was continually scanning back and forth between the two radar systems. When I issued the vector for the intercept I'm certain I was looking at the short-range radar, the ASR 8, and when I switched frequencies to the Agana Tower I'm certain I was observing the aircraft on the ASR 8.

MR. WENTWORTH: At the time that you issued the approach clearance to the crew of Korean Air 801, were there any weathers of area being depicted on the terminal radar system?

THE WITNESS: Yes, sir. There was.

MR. WENTWORTH: Can you describe for us your observations?

THE WITNESS: There was an area of weather approximately from three to six miles on final -- on the approach course.

MR. WENTWORTH: That was along the approach course, sir?

THE WITNESS: Yes, sir. It was on the approach course.

MR. WENTWORTH: Did you have any idea of what the intensity level might have been?

THE WITNESS: No, sir. I did not. I had not received any information of any significant weather in the area.

MR. WENTWORTH: Did you advise the crew of Korean Air 801 about your observations of this weather?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: Did you advise the local controller at Agana Tower about the weather?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: Is there any requirement for you to have done so?

THE WITNESS: Yes, sir. There is.

MR. WENTWORTH: Can you tell us why that did not occur?

THE WITNESS: I assume that the flight crew was using their cockpit radar as they had twice previously asked for deviations around weather while I was working with them. And their cockpit radar is more accurate and more precise than the radar that I have.

And the tower, I -- I failed to inform them --

(Pause)

MR. WENTWORTH: All right. Mr. Mayo, when was your last observation of the target in the data block of Korean 801 on radar? When did that occur?

THE WITNESS: The last time I remember observing the data block was when I switched them to the tower. I'm certain that I scanned back to the data block at some time later. But I don't recall precisely when that might have been.

MR. WENTWORTH: When you advised the crew to go to the tower, did you look at the data block at that particular time? Is that what I understood?

THE WITNESS: Yes, sir. I did.

MR. WENTWORTH: What was the altitude of the aircraft at that time? Do you recall?

THE WITNESS: To my best memory, 2020 feet.

(Pause)

MR. WENTWORTH: Did you observe the data block on radar go into coast at any point?

THE WITNESS: No, sir. I did not.

(Pause)

MR. WENTWORTH: Prior to being advised by the local controller that he was no longer in contact with the flight, did you continue to monitor the aircraft's progress to the airport in any manner?

THE WITNESS: Yes, sir. I -- I scanned my radar scopes and I'm sure that I saw the data block at different occasions during the approach. I continued to provide radar monitoring.

CHAIRMAN FRANCIS: Richard, we're -- we're having a little trouble with the interpretation here, so if we can just slow it down a little bit just so that they can keep up, and -- and Mr. Mayo, if you could as well. It's -- it's kind of tough for those folks.

MR. WENTWORTH: Sure. I understand. Thank you.

After being told by the local controller that the aircraft was down, why did you believe you needed to have a confirmation from another airborne aircraft if you monitored the progress of the aircraft?

THE WITNESS: Would you please restate that?

MR. WENTWORTH: After being advised by the local controller that he was no longer in contact with Korean Air 801, why did you believe you needed a confirmation from another airborne aircraft, specifically Ryan 789?

THE WITNESS: I was fairly certain in my mind that the aircraft had crashed, but I thought it would be best and -- to get a confirmation visually, and Ryan

was in a perfect position to observe the area.

MR. WENTWORTH: So at what point did you initiate either a crash response or get your associate in the control room? What -- what -- at what point did that occur?

THE WITNESS: When the pilot of the Ryan aircraft advised me that he saw a fire on the hillside I was certain. At that time I contacted my co-worker who began making the appropriate phone calls.

MR. WENTWORTH: Well, if you felt that the aircraft had crashed before getting the confirmation, would it have been incumbent upon you to initiate some type of crash response?

THE WITNESS: Yes, sir. It may have been. I just wanted to be -- I wanted to be 100 percent sure.

MR. WENTWORTH: I'd like you to refer to Exhibit 3G, please, Mr. Mayo.

(Pause)

MR. WENTWORTH: If you would look at the -- this is the facility accident incident notification record that was developed by the CERAP for which you work. And if you'll notice the second block there, it says, "Government of Guam off-base crash." Do you have specific procedures for a crash that occurs off Guam International Airport?

THE WITNESS: Yes, we do.

MR. WENTWORTH: Can you explain what those would be?

THE WITNESS: We have a checklist book at the supervisor's desk that gives us a list of what parties to call.

MR. WENTWORTH: And what -- I noticed on the next line there it says, "U.S. Coast Guard Search and Rescue." Is the response to them initiated concurrent with an off-airport crash?

THE WITNESS: The Coast Guard is always notified.

(Pause)

THE WITNESS: They assist in on-shore as well as off-shore.

MR. WENTWORTH: Did you make any of these notifications on the sheet?

THE WITNESS: No, sir. I was working the radar, and my co-worker made the calls.

MR. WENTWORTH: You will notice the times that are listed on the sheet. There is a listing for the facility manager, Mr. Cornelison, and it shows a time of 16:02. Do your procedures require that he be the first person notified in the event of an accident?

THE WITNESS: First, we should notify the Coast Guard or the search-and-rescue parties.

MR. WENTWORTH: Mr. Mayo, did you observe any visual MSAW alerts for Korean Air 801?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: Based on the record we know that one was indeed developed. If you had observed it, where would it have been displayed as it would have been generated by the Micro-EARTS radar -- automation?

MR. WENTWORTH: Only on the long-range radar system, and the letters MSAW would flash in the lower portion of the data block as well as being displayed in the alert tab list. The call sign would be -- the call sign would be displayed in the alert tab list on the scope.

MR. WENTWORTH: And where was that particular list located on your radar scope?

THE WITNESS: The alert tab list was located at the upper and center portion of my scope.

MR. WENTWORTH: To your knowledge, sir, is there an MSAW speaker in the control room?

THE WITNESS: Yes, sir. There is.

MR. WENTWORTH: And can you tell me where that's located?

THE WITNESS: To the right of the R4 position approximately 10 to 15 feet above one of the radar scopes. It's clearly audible throughout the room from that position.

MR. WENTWORTH: Prior to be notified by the tower that he was no longer in contact with Korean Air 801 did you hear any oral MSAW alerts?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: Prior to the day of this accident were you aware that the alert system, the MSAW was virtually non-existent?

THE WITNESS: No, sir. I was not.

MR. WENTWORTH: Prior to the day of this accident were you aware that you would not receive an oral MSAW alert from the Micro-EARTS system?

THE WITNESS: No, sir. I was not.

MR. WENTWORTH: Do you provide approach control services to other airports?

THE WITNESS: Yes, we do.

MR. WENTWORTH: Other than Guam International?

THE WITNESS: Yes, sir. We do.

MR. WENTWORTH: For instance, which airports, sir?

THE WITNESS: Anderson Air Force Base, which is located on the island of Guam; Rhode International Airport; Tinion and Saipan International Airport.

MR. WENTWORTH: Can you tell me what a safety alert is, Mr. Mayo?

THE WITNESS: A safety alert is an -- advisory to an aircraft to alert them of a situation which may be unsafe.

MR. WENTWORTH: In what response -- in what -- in what level of hierarchy of -- in your job does that particular function fall?

THE WITNESS: It along with separation is a first priority.

MR. WENTWORTH: Do you consider issuing -- excuse me, sir. Do you consider MSAW in itself, this particular function, as a safety feature?

THE WITNESS: Yes, sir. I do.

MR. WENTWORTH: In your view as a controller, do you believe that MSAW provides protection for you in doing your job?

THE WITNESS: Protection for me?

MR. WENTWORTH: For yourself.

THE WITNESS: It assists me in doing my job.

MR. WENTWORTH: Can you amplify how it would assist you?

THE WITNESS: It alerts me to situations which may be unsafe so that I can alert the crew members or the controller who's in control of the aircraft.

MR. WENTWORTH: To your knowledge, is MSAW now working at Guam?

THE WITNESS: Yes, sir. It is.

MR. WENTWORTH: I don't believe I have any further questions. Thank you.

CHAIRMAN FRANCIS: All right. We'll now go to the party questioning of Mr. Mayo, and we'll start with the Korean accredited representative. It'll take us a second here so all of us can get our headsets on.

(Pause)

CHAIRMAN FRANCIS: You all right, Mr. Mayo? You okay?

THE WITNESS: Yes, sir.

CHAIRMAN FRANCIS: All right. Korean CAB?

MR. LEE: Mr. Chairman, thank you very much. And ladies and gentlemen, thank you very much. Mr. Kurt Mayo, thank you very much.

(The following is a verbatim transcript of the English translation of Mr. Lee's questions posed in Korean and Mr. Mayo's responses in English.)

MR. LEE: Are there seven positions at the Guam Control Tower, including CERAP coordinator approach control, oceanic, and domestic?

THE WITNESS: No, sir. There are six.

MR. LEE: If that is the case, then when approach clearance was issued for KAL 801, were you, Kurt Mayo, there on your own, by yourself?

THE WITNESS: There were two persons on duty.

MR. LEE: Okay. Then, you two started to work together. However, the other controller was on duty only an hour then went on break. Is that what happened?

THE WITNESS: I'm not certain of the amount of time that he worked prior to his break.

MR. LEE: Regarding the breaks at your control center, is there any formalized way of taking duties on a shift basis, such as a staggering fashion, or is it that you can take a break at any time of your choosing?

THE WITNESS: The breaks are based on the traffic load, the number of persons assigned to the shift, and it's normally controlled by the supervisors or the controller-in-charge.

MR. LEE: When the approach clearance was issued for KAL 801, were both radars used, one for en

route and the other for approach control?

THE WITNESS: Yes, sir. I was scanning back and forth between both radar scopes, the long-range and the short-range.

MR. LEE: When approach clearance was issued, I understand there were eight aircraft which received approach clearance. Of the eight, how many were given clearance using the en route radar and how many using the approach control?

(End of translation)

CHAIRMAN FRANCIS: Could we -- excuse me. Could we stop for a minute, please? We've got two things. Number one, the court reporter is having a problem here, and let's get that clarified because that's the official record. So, what -- what do we need to do here, Carolyn?

(Pause)

CHAIRMAN FRANCIS: Please be back -- it's now 10:30 -- at 10:45. We'll make it a 15-minute break.

(Whereupon, a brief recess was taken.)

CHAIRMAN FRANCIS: We'll resume the -- the KCAB, still questioning Mr. Mayo. And go ahead, gentleman.

(The following is a verbatim transcription of the English translation of Mr. Lee's questions posed in

Korean and Mr. Mayo's responses in English.)

MR. LEE: On the previous occasion in connection with your working system at your control tower following the accident, the work system that you had set up might have been changed. If the -- if that was the case, if there were any changes, can you tell us what actions you take following the accident?

THE WITNESS: The MSAW system was changed.

MR. LEE: FAA Order 7110.65K. According to the regulation of said FAA Order there are such provisions. Let me read. "If -- is this -- if altitude heading or other items are read -- are read back by the pilot ensure the read-back is correct. If incorrect or incomplete make corrections as appropriate."

However, with respect to the accident aircraft, Korean Air Aircraft, when you were issuing approach clearance you -- Korean Air 801 -- Korean 801 cleared for ILS runway 6-left approach, glide slope unusable. When you said that the -- the Korean Air pilot read back just simply, quote, "Korean 801, roger. Cleared for ILS runway 6-left," quote. As the result, the glide scope -- "glide slope unusable" section was not read back. Did you notice that and correct that?

THE WITNESS: Yes, sir. I noticed that. I only need to correct the read-back if the pilot's read-back was incorrect. Nothing that he read in his read-back was incorrect. And the use of the term "Roger" in and of itself is sufficient. The word "Roger" according to the pilot controller glossary in our handbook means that the pilot has received and understands my last clearance in its entirety.

CHAIRMAN FRANCIS: And I would say again Mr. Mayo has already been asked this question and answered it to Mr. Wentworth.

MR. LEE: Okay. Let me then move on to one more question.

FAA Order 7110.65K 5-1-17, radar service termination. According to the said regulation radar service termination should be notified to the accident aircraft. That is my understanding. Did you actually do that to the accident aircraft?

THE WITNESS: Would you please restate the question?

MR. LEE: FAA Order -- according to FAA Order 7110.65K, air traffic control paragraph 51-13, radar service termination. According to the provisions of the regulation, CERAP power controller should notify radar service termination to the accident aircraft.

And what I asked you just now is that whether you performed that obligation.

THE WITNESS: The section also reads that radar service is automatically terminated and the pilot not -- need -- need not be advised when the aircraft lands. Radar service is automatically terminated and the pilot need not be advised when the aircraft lands.

MR. LEE: Just bear with me. Let me have time to just ask two more questions.

Agana Tower D-BRITE increment was established as of January 1997. Were you aware of that?

THE WITNESS: I am aware that the Agana Tower has a D-BRITE.

MR. LEE: And then let me ask you the final question. At the time of the accident 15:32 hours there was official weather advisory. With respect to this official weather advisory measurement, did you receive any notification from the Agana Control Tower?

THE WITNESS: No, sir. I did not.

MR. LEE: Okay. Then let me follow up on that question to ask you whether you received any such weather advisory notification from any other organizations, including the Weather Bureau?

THE WITNESS: No, sir. I did not.

MR. LEE: At the CERAP are there any -- any receiving increment to receive meteorological information?

THE WITNESS: Yes, sir. There -- there is. There's a teletype printer and also a weather television monitor.

MR. LEE: FAA Order 7110.65K 4-7-8, weather information regulation. According to the provisions set forth in this particular regulation, the controller -- when there is official weather or meteorological advisory either the controller is supposed to issue instrument landing clearance or issue notification based on that. At that time did you notify the pilot of the accident aircraft, Korean Air aircraft such notice?

THE WITNESS: -- the questions.

MR. LEE: The controller, when he receives or recognize a special weather advisory prior to issuing instrument landing clearance, he should notify the pilot of the special weather advisory status or information or to include such information within such instrument landing clearance. That is the regulation. Did you ever notify the Korean Air pilot of any such special weather advisory information?

THE WITNESS: No, sir. I did not. I was not aware of any special weather or significant weather in the area.

MR. LEE: Thank you very much. That's all.

(End of translation)

CHAIRMAN FRANCIS: Thank you.

Boeing Company?

MR. DARCY: Thank you, Mr. -- excuse me, Mr. Chairman. We don't have any questions for the witness.

CHAIRMAN FRANCIS: Thank you.

Barton ATC?

MR. E. MONTGOMERY: No, Mr. Chairman. No questions.

CHAIRMAN FRANCIS: Korean Air?

CAPTAIN KIM: No questions.

CHAIRMAN FRANCIS: NATCA?

MR. MOTE: Yes, thank you, Mr. Chairman.

Mr. Mayo, in your almost 20 years experience as an air traffic controller in the Navy, Los Angeles approach, and now Guam CERAP, has it been a fairly common experience --

CHAIRMAN FRANCIS: Excuse me. Slower, please. Controllers -- we understand the controller's business is to speak fast, but here you've got to sort of work in reverse.

MR. MOTE: Yes, sir. Thank you, Mr. Chairman.

In your experience, is it a common daily occurrence for flight crews to read back clearances and acknowledge clearances, particularly with respect to approach clearances with terms such as "roger" and perhaps with partial acknowledgement of elements of that clearance?

THE WITNESS: Yes, sir. It is.

MR. MOTE: Thank you. And also, in your experience as a controller, do you operate with the daily anticipation -- in other words, is it your expectation that flight crews that are coming into your air space will comply with the FARs by familiarizing themselves with NOTAMs and equipment outages affecting their flight? Do you operate with that expectation?

THE WITNESS: Yes, sir. I do.

MR. MOTE: And based on the answer to that --

CHAIRMAN FRANCIS: Slowly. Slowly.

MR. MOTE: Sorry.

And based on that answer, given the fact that you expect the crews to be familiar with outages and other things affecting the condition of that flight and given the fact that you ensured that the flight crew had or was receiving the ATIS uniform in effect at the

time, which broadcast the glide slope outage, and given the fact that you issued the handbook phraseology "glide slope unusable" in the approach clearance, was there any doubt in your mind that this crew should have been aware that the glide slope was not in service at the time the approach clearance was issued?

THE WITNESS: No, sir. There was not.

MR. MOTE: Okay. Thank you.

That's all, Mr. Chairman. Thank you very much.

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: No questions, sir.

CHAIRMAN FRANCIS: FAA?

MR. DONNER: Thank you, Mr. Chairman.

Mr. Mayo, just two short questions. What would you characterize your workload as at the time of the accident?

THE WITNESS: Light to moderate.

MR. DONNER: And the complexity of the situation at that time?

THE WITNESS: I'd characterize the complexity as routine.

MR. DONNER: Thank you very much. Thank you, sir.

CHAIRMAN FRANCIS: All right. Thank you. That completes the parties.

Mr. Feith, you got anything further?

MR. FEITH: I just have a couple of questions, sir.

Mr. Mayo, with regard to the MSAW, have you received any formal training on the MSAW in your position?

THE WITNESS: I've received courses and I feel that I've been well-trained in MSAW. I know what it is, I know how to use it.

MR. FEITH: Can you just characterize for me the type of training that you would have received? Was it videos? Was it hands-on? Was it book work?

THE WITNESS: Written courses as well as videos.

MR. FEITH: How long a training period is that? A day? A month? A year? How much training?

THE WITNESS: Each session may last for 30 to 60 minutes.

MR. FEITH: And with regards to recurrent training, do you receive recurrent training?

THE WITNESS: Yes, we do.

MR. FEITH: Prior to the accident had you received training on MSAW?

THE WITNESS: Yes, I had.

MR. FEITH: And subsequent to the accident have you received training on MSAW?

THE WITNESS: No, sir. I have not.

MR. FEITH: I have no further questions, Mr. Chairman.

CHAIRMAN FRANCIS: Pat?

MR. CARISEO: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: I -- I'd -- I'd like to clarify one thing here. And this is something that's come up as -- during your testimony. This is the question of the difference between out of service and unusable, if there is a difference, in terms of the glide slope. When one reads the NOTAM, and you may not be the -- the person to answer this question, but the NOTAM says out of service. You said when you gave the clearance to the -- to the aircraft unusable. Is there, to your knowledge, a difference in these or is that effectively the same thing?

THE WITNESS: It's effectively the same thing.

CHAIRMAN FRANCIS: All right. Thank you. We appreciate your being here with us, and I understand you have to leave so that you will not be subject to perhaps coming back. We -- we do appreciate your

coming and being with us.

THE WITNESS: Thank you.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: The next witness is Mr. Marty Theobald, local controller, Barton ATC.

Whereupon,

MARTY THEOBALD

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

MARTY THEOBALD

LOCAL CONTROLLER

BARTON ATC INTERNATIONAL, INC.

AGANA CONTRACT AIR TRAFFIC CONTROL TOWER

CHAIRMAN FRANCIS: Mr. Wentworth?

(Pause)

CHAIRMAN FRANCIS: Oh, I'm sorry.

MR. SCHLEEDE: Mr. Theobald, please state your full name and business address for our record.

THE WITNESS: Marty Theobald. 202 -- correction. 2024 Piper Avenue, Pocatello, Idaho.

MR. SCHLEEDE: And what is your present position? Work position?

THE WITNESS: I'm an air traffic control specialist for Barton ATC International, Incorporated,

and I'm currently in training at that location.

MR. SCHLEEDE: Could you move just a little closer to the microphone, please?

THE WITNESS: Yes, sir.

MR. SCHLEEDE: Could you give us a brief description of your education and training and experience that -- qualifies you for your present position?

THE WITNESS: Yes, sir. I began my air traffic control experience with the United States Navy in 1983. I completed the air traffic control basic course in October of that year.

I was subsequently stationed in -- at an approach control facility in Texas. I was qualified as a ground controller and a flight data controller in the tower there as well as full facility rated in the radar facility.

I transferred from there in April of '89 and arrived in May in Guam at Naval Air Station, Agana, Guam. Subsequently, complete facility rated there both route -- and tower and radar. I also served approximately six months as the radar branch manager there.

April of '92 I was reassigned to the air traffic control facility officer as an administrative

assistant until my separation from Navy in October of '92.

I was hired by Barton Air Traffic Control, Incorporated -- I'm sorry. Barton Air Traffic Control International, Incorporated in May of '95 as an air traffic control specialist in Guam International Control Tower, which was the former NAS Agana Tower.

January of this year we had a opening at another facility and I requested a transfer. And I did transfer in February, and I'm in training now.

MR. SCHLEEDE: Thank you very much. Mr. Wentworth will proceed.

MR. WENTWORTH: Thank you, Mr. Schleede.

Mr. Theobald, you said that currently you're in Pocatello, Idaho?

THE WITNESS: Yes, sir.

MR. WENTWORTH: When did you transfer from Guam?

THE WITNESS: In February of this year.

MR. WENTWORTH: Was this at your request?

THE WITNESS: Yes, sir. It was.

MR. WENTWORTH: Are you medically -- certified as a controller, sir?

THE WITNESS: Yes, sir. I am.

MR. WENTWORTH: Do you have any waivers or limitations?

THE WITNESS: No, sir.

MR. WENTWORTH: And when was your last physical, please?

THE WITNESS: October of last year, sir.

MR. WENTWORTH: And at the time that you were working in the tower on the night of this -- accident you were a fully certified controller at that time?

THE WITNESS: Yes, sir. I was.

MR. WENTWORTH: To your knowledge, is it standard procedure to work that particular shift by yourself?

THE WITNESS: Yes, sir. It is.

MR. WENTWORTH: Can you explain what the procedures would have been for taking a break to go to the bathroom or something like that?

THE WITNESS: You would normally wait until the traffic permits. You would coordinate with Guam CERAP that you would be out of the tower momentarily. You would also coordinate with airport authority's ramp control to let them know you would be out of the tower should an aircraft call on either ground or tower frequency. And you would take a hand-held with you when you went down to the facilities.

MR. WENTWORTH: Having seen this coordination take place, is it fair to say that you remained in the tower while you were on duty prior to the time of the accident?

THE WITNESS: Yes.

MR. WENTWORTH: Teddy, can you put up 3E for us, please?

(Pause)

MR. WENTWORTH: Mr. Theobald, this is a layout of the control tower. Can you tell us where you were primarily located during the course of the shift?

THE WITNESS: Primarily in this location, sir. In front of the local control position.

MR. WENTWORTH: Okay, sir. And to orient us of the view of the tower cab in relation to the runways, could you tell us where those would generally be?

THE WITNESS: Yes, sir. The runways would be located on this side.

MR. WENTWORTH: So your scan would be from your left to your right?

THE WITNESS: Yes, sir. The approach end of runway 6 would be this direction.

MR. WENTWORTH: Okay. And from the tower cab, where is the crash/fire/rescue station located?

THE WITNESS: Sir, it would be located on this portion over in here.

MR. WENTWORTH: Off to the right.

THE WITNESS: Yes, sir. Off to the right in the local control position.

MR. WENTWORTH: Now, would you point out for us the D-BRITE radar displays?

THE WITNESS: Yes, sir. There's one located here and there's one located here as well.

MR. WENTWORTH: Would you point out where the crash/fire/rescue phone is?

THE WITNESS: The crash phone would be located right here, sir.

MR. WENTWORTH: Could you show us where the monitor panel for the ILS six-left is?

THE WITNESS: Be located right here.

MR. WENTWORTH: And where do you receive your weather?

THE WITNESS: Comes in via a printer located right here, sir.

MR. WENTWORTH: Okay. Right --

THE WITNESS: I'm sorry. It would be right here.

MR. WENTWORTH: And then the ATIS recording station is just above that, is that correct?

THE WITNESS: Yes, sir. That would be ATIS.

MR. WENTWORTH: And where is the phone for the search and rescue?

THE WITNESS: We have a line that is located over in this that is a coordination line with the Coast Guard.

MR. WENTWORTH: Thank you.

Thank you, Teddy.

(Pause)

MR. WENTWORTH: Can we bring up the lights? Thank you.

Would you pull out Exhibit 3H, hotel, please?

(Pause)

MR. WENTWORTH: My correction, Marty. That's 3 foxtrot.

THE WITNESS: I'm sorry?

MR. WENTWORTH: 3 foxtrot. 3F.

THE WITNESS: Foxtrot?

(Pause)

MR. WENTWORTH: Okay. Sir, on page -- the first page here we see two ATIS messages.

THE WITNESS: I'm -- I'm sorry. I can't hear you, sir. I can't hear you.

MR. WENTWORTH: On the first page there are two ATIS -- there's two messages here, weather

sequences which appear to be marked U and V.

THE WITNESS: Yes, sir. The U and the V would be the letter for the phonetic alphabet of that ATIS broadcast.

MR. WENTWORTH: So, were those annotations made by you?

THE WITNESS: Yes, sir. That is my writing.

MR. WENTWORTH: If you'd look on the last page we have the sequence from the National Weather Service, and it would appear there's a mark on about the fourth one down. That particular sequence seems to be the same as the ATIS broadcast Uniform that you developed.

And then at the next mark further down at 02:04 if you see that, Marty, on that last page?

THE WITNESS: Yes, sir.

MR. WENTWORTH: It appears that that sequence is the same as ATIS broadcast Victor.

THE WITNESS: Yes, sir.

MR. WENTWORTH: Okay. Now, it appears here in looking at the last page there are two specials, one issued at 01:32, 01:47, 0 -- the hourly at 01:50, and then a -- an additional three specials there.

THE WITNESS: Yes, sir.

MR. WENTWORTH: Can you tell us why these particular broadcasts or this weather was not disseminated by you as the local controller?

THE WITNESS: Sir, the special observation with the time of 01:32, I was in the process of recording that broadcast when CERAP called me with an in-bound which stopped me in the middle of that -- that recording. I went back to the recording and was in the process of checking it for correctness when the Korean Air aircraft checked in with me.

The ones beyond that were during the period when I was attempting to locate the aircraft and I was performing higher priority duties than the weather at that point.

MR. WENTWORTH: Are you certified to determine the prevailing visibility?

THE WITNESS: Yes, sir. I am.

CHAIRMAN FRANCIS: And in Guam in particular on -- on this accident?

THE WITNESS: I'm sorry?

MR. WENTWORTH: At Guam in particular during the time of this accident?

THE WITNESS: Yes, I was.

MR. WENTWORTH: At what point does the tower assume responsibility for determining prevailing

visibility?

THE WITNESS: If the visibility drops below five miles, sir.

MR. WENTWORTH: With the hourly weather sequence we see the visibility being reported as three statuate miles. And then it reduces down to one, back up to two, and then back to four. Did you make any of these determinations of prevailing visibility?

THE WITNESS: No, sir. At that point I was involved in coordination reference the air -- accident aircraft and was searching for the aircraft as well.

MR. WENTWORTH: So, these would have been visibility at the surface as determined by the weather -- National Weather Service?

THE WITNESS: Yes. Those would be their determinations on visibility, sir.

(Pause)

MR. WENTWORTH: And if you'd look on page two of these sequences.

THE WITNESS: F2?

MR. WENTWORTH: F2, yes. That's correct, Marty.

There is a time of receiving 15:25 and then a time apparently of the sequence 15:32. There appears to be a disparity there. Can you explain what was

occurring?

THE WITNESS: I believe that that time in the -- the receiving time there is a time that's set in the system itself, the actual printer in the tower cab. It appears to be that the -- the clock on that was not correct.

MR. WENTWORTH: Is there a way that you had to set that or check that?

THE WITNESS: No, sir. We're not allowed to set any equipment or make any adjustments to any equipment in the control tower.

MR. WENTWORTH: Okay. Thank you.

(Pause)

MR. WENTWORTH: Go to 3 X-ray, page 12.

(Pause)

THE WITNESS: Yes, sir. I have that.

MR. WENTWORTH: Okay. This is the maintenance log for the glide slope at Guam. In the upper right-hand corner it's marked June 1997. However, in the middle of the page it's carried on to July of 1997. Do you see that?

THE WITNESS: Yes, sir. I do.

MR. WENTWORTH: I'd like to direct your attention to the July entry of the 7th where it says that the glide slope is out of service, to replace the

building coordination with ATCT, and then in parens (Marty), and then the MCC and in parens, (TC). The "Marty" that's being referred to on this particular log, was that you?

THE WITNESS: I would have -- correction. It appears to be, yes, sir. I'm the only Marty that works in the control tower.

MR. WENTWORTH: Okay, sir. So then you did have knowledge that the glide slope was out of service?

THE WITNESS: Not at that point, sir. I was on vacation then in the United States mainland on 7 July.

MR. WENTWORTH: So,then somebody had to be mistaken when they put your name down here, is that correct?

THE WITNESS: Yes, sir. It appears that way.

MR. WENTWORTH: All right. Does the tower issue NOTAMs?

THE WITNESS: I'm sorry?

MR. WENTWORTH: Does the tower issue NOTAMs?

THE WITNESS: No, sir. We do not.

MR. WENTWORTH: Do you know who does?

THE WITNESS: I believe it would be Guam Airport Authority or the FAA Airways Facilities people or Maintenance Coordination Center in Honolulu.

MR. WENTWORTH: Okay. You pointed out for us earlier the monitor panel for the ILS to runway 6-left.

THE WITNESS: Yes, sir.

MR. WENTWORTH: In the event of a failure of either the glide slope or the localizer -- that is the two components that you would monitor, is that correct?

THE WITNESS: Yes, sir.

MR. WENTWORTH: Would you receive any type of an alert?

THE WITNESS: Yes, sir. There would be a visual actual change from one color light to another as well as an audible tone.

MR. WENTWORTH: Now, did you receive any type of audible alerts or visual alerts for the glide slope or the localizer that morning?

THE WITNESS: When I arrived to work to the best of my knowledge the glide slope was already in a failed position. A red light in the localizer was in the green, which would be the operational position.

MR. WENTWORTH: However, you were aware at that particular point the glide slope was indeed out of service, is that correct?

THE WITNESS: Yes, I was.

MR. WENTWORTH: During the time that you were on shift did you receive any reports from pilots of any

problems with NAV/AIDs that serve the airport?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: When Korean Air 801 was inbound to the airport did you observe the flight?

THE WITNESS: No, sir. I never did see the aircraft.

MR. WENTWORTH: Did you know why you were not able to see the airplane?

THE WITNESS: No, sir.

MR. WENTWORTH: Did there become a point at which you believed you should have been able to see the airplane?

THE WITNESS: Yes, sir.

MR. WENTWORTH: And can you tell us when that was?

THE WITNESS: It would have been approximately three to four minutes after I cleared the aircraft to land.

(Pause)

MR. WENTWORTH: If you would, Marty, go to 3 India, page 13.

(Pause)

THE WITNESS: Yes, sir.

MR. WENTWORTH: -- to the left on the page, paragraph 3-10-7. Landing clearance without visual --

THE WITNESS: I'm sorry. What -- what paragraph, sir?

MR. WENTWORTH: 3-10-7 on page 13.

(Pause)

THE WITNESS: Yes, sir.

MR. WENTWORTH: Okay. You see that to the left?

THE WITNESS: Yes, sir.

MR. WENTWORTH: Landing clearance without visual observation?

THE WITNESS: Yes, sir.

MR. WENTWORTH: We note that in the transcript that the flight was not told that they were not in sight. Can you tell us why they were not advised of this?

THE WITNESS: As this states, when an arriving aircraft reports a position where he should be seen but has not been visually observed, and I don't believe he was in a position where I should have visually seen him when he checked in with me.

MR. WENTWORTH: And based on what, sir?

THE WITNESS: The distance of the aircraft from the airport on the initial call from CERAP with the in-bound and his position distance from the airport being to the west to 12 miles.

MR. WENTWORTH: You heard the earlier testimony of Mr. Mayo that there was weather along the final approach course between the flight and the airport?

THE WITNESS: Yes, sir. I have.

MR. WENTWORTH: Had you known that weather was out there would you have done anything differently?

THE WITNESS: Yes, sir. I would have.

MR. WENTWORTH: Could you amplify?

THE WITNESS: I would have immediately on initial contact with the aircraft I would have read him the weather observation that I was attempting to record at the time. And I -- if I had known that cell was there I would have issued that information to the aircraft as well to be sure that he had the information.

MR. WENTWORTH: And another point that I'd like to make, when you said that the monitor panel had a red light for the glide slope, what was being shown on the localizer? What did you receive on that?

THE WITNESS: On the status panel, sir?

MR. WENTWORTH: Yes, sir. On the status panel.

THE WITNESS: Yes, the glide slope was in the red, which would be the alarm position, and the

localizer was in the green, which would be the go indicator, operational.

MR. WENTWORTH: Thank you. At what point did you become concerned about Korean Air 801?

THE WITNESS: As I said before, approximately three to four minutes after I issued him his landing clearance he was not visible and not over the approach into the runway.

MR. WENTWORTH: And so, then what did you do?

THE WITNESS: I commenced a communication search for the aircraft.

MR. WENTWORTH: Which included calling the ramp?

THE WITNESS: Yes, sir. It did.

MR. WENTWORTH: From the tower cab how far are the runway out in front of you?

THE WITNESS: Approximately one-quarter mile, sir.

MR. WENTWORTH: Can you normally hear aircraft landing in the -- and taking off?

THE WITNESS: Yes, sir. You can.

MR. WENTWORTH: After you called the CERAP and was told by them that the aircraft was no longer on radar, why did you call Anderson Air Force Base?

THE WITNESS: To ascertain whether or not the aircraft had possibly landed there, sir.

MR. WENTWORTH: Have you ever had a commercial air carrier land at Anderson inadvertently?

THE WITNESS: No, sir. It has not happened to me personally.

MR. WENTWORTH: Has it ever happened to your knowledge?

THE WITNESS: When I got to Guam it was one of the things in my training that they cautioned me on, that it had happened prior.

MR. WENTWORTH: Do you know whether this occurred during the day or -- or during -- at night?

THE WITNESS: I'm not sure if that was a day -- during the day or at night.

MR. WENTWORTH: In your view, was there a reluctance on your part to initiate a crash response?

THE WITNESS: No, sir. Not once I had some actual evidence and -- and a position and a location to send someone to.

MR. WENTWORTH: So you felt like you had to have a location before you could send vehicles out to nowhere?

THE WITNESS: Yes, sir.

MR. WENTWORTH: I see. And you pointed out for us earlier there's a crash -- a search-and-rescue phone on the tower cab. Did you use that in any manner?

THE WITNESS: No, sir. I did not.

MR. WENTWORTH: And why not?

THE WITNESS: We don't have an established procedure for using that for search-and-rescue type information. That's normally a line that's used for coordination between the Coast Guard and us, normally in-bound calls to the tower.

MR. WENTWORTH: And that's how you've seen it used?

THE WITNESS: Yes, sir.

MR. WENTWORTH: For an off-airport crash, do you still retain responsibility to initiate the crash/fire/rescue response?

THE WITNESS: Yes, sir. I would make the notification as soon as I become aware of it to ramp control, which would then make the notifications to the appropriate Government of Guam agencies.

MR. WENTWORTH: And now I'd like you to go to 3H, please, Marty. This is the facility accident incident notification record.

(Pause)

THE WITNESS: I'm sorry. I don't have that.

(Pause)

THE WITNESS: Thank you. Yes, sir.

MR. WENTWORTH: At the first entry there at the top of the page it shows a time, and would you tell us what time that is?

THE WITNESS: 15:58 --

MR. WENTWORTH: And then there's initials. Who is that -- those initials?

THE WITNESS: Those are my initials behind that.

MR. WENTWORTH: T.O. is your initials?

THE WITNESS: Yes, sir. Those are my operating initials.

MR. WENTWORTH: And the recipient was Juan -- does it appear?

THE WITNESS: Yes, sir.

MR. WENTWORTH: So, is this handwriting yours?

THE WITNESS: Yes, sir. That is.

MR. WENTWORTH: And when this entry was made, from where did you derive the time?

THE WITNESS: From my directory digital clocks in the tower on the local control position.

MR. WENTWORTH: Was it marked or annotated concurrent with the time you made the call?

THE WITNESS: I'm sorry?

MR. WENTWORTH: Was it marked concurrent with the time that you made the call?

THE WITNESS: Yes, sir.

MR. WENTWORTH: You showed us earlier that from the tower you were able to see the crash/fire/rescue -- the crash/fire station?

THE WITNESS: Yes, sir.

MR. WENTWORTH: After you made the notification did you see any of those trucks leave?

THE WITNESS: Not to my knowledge.

MR. WENTWORTH: During the duration of the time you were in tower?

THE WITNESS: No, sir.

MR. WENTWORTH: Do you know whether they have a requirement to leave the station for off-airport crash?

THE WITNESS: That would be based on the Airport Authority's releasing them, to my knowledge.

MR. WENTWORTH: Mr. Theobald, what -- what is a safety alert?

THE WITNESS: A safety alert would be a -- an alert that you would issue to an aircraft if you were

aware that he is too close to terrain, obstructions, or another aircraft.

MR. WENTWORTH: Have you received any formal training on MSAW?

THE WITNESS: During wash -- which portion of my career, sir?

MR. WENTWORTH: While you've been with Barton.

THE WITNESS: No, sir.

MR. WENTWORTH: During what portion have you received training?

THE WITNESS: When I was an approach controller in -- when I was stationed in Texas we had an MSAW system there and I had some training there for it, sir.

MR. WENTWORTH: So you basically know what it is?

THE WITNESS: Yes, I understand what the system is.

MR. WENTWORTH: Okay. Had you been told by the CERAP controller to issue a safety alert to Korean Air 801, what would you have done?

THE WITNESS: I would have issued the low altitude alert, check your altitude immediately, to the aircraft.

MR. WENTWORTH: I believe I have no further questions. Thank you.

CHAIRMAN FRANCIS: KCBA -- does KCAB?

(The following is a verbatim transcript of the English translation of Mr. Lee's questions posed in Korean and Mr. Theobald's responses in English.)

MR. LEE: You have pretty much covered all the questions that we originally intended to, so let me just touch up on several simple issues.

(Disruption in recording)

THE WITNESS: -- pilot report or notification from the FAA -- personnel -- was not operational.

MR. LEE: Let me just confirm one more thing. On January 16, 1997, at Agana Tower there were two D-BRITEs installed at the Agana Control Tower. Up until -- up to the moment of accident, for about six months, for 24 hours around the clock the two D-BRITEs were turned on. Did you ever actually use the increment -- D-BRITE increment? If you ever did, then please let me know, particularly with respect to the accident? Have you ever utilized D-BRITE system in connection with this accident?

THE WITNESS: No -- no, I did not use -- utilize that system as it is not a certified system and it is not an operational piece of equipment.

(End of translation)

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: I have no questions, Mr. Chairman.

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: Yes, sir. I just have a couple questions. And the first one's by way of clarification. I'm sorry I missed your answer, Marty.

At 01:58 you notified who?

THE WITNESS: Ramp Control, I'm sorry.

MR. DERVISH: Is there a notification list that you have for notification or do you just call Ramp Control?

THE WITNESS: Yes, sir. We do have a notification list. That would be the exhibit that I was looking at at the time, 3 Hotel.

MR. DERVISH: And who else did you notify?

THE WITNESS: My next call was to the facility and the air traffic manager, and then we commenced with the -- I commenced with my portion of this as I was able to with other things that were going on with coordination.

MR. DERVISH: So you -- you did contact 911 and those --

THE WITNESS: I'm sorry?
MR. DERVISH: Who contacted 911?
THE WITNESS: It was not I. I don't know.
MR. DERVISH: And just by way of clarification again, and I might have missed it, did you say the clock might have been wrong in the tower? Or did I miss that?
THE WITNESS: That would be the printout clock for the weather --
MR. DERVISH: Oh.
THE WITNESS: -- received time.
MR. DERVISH: Okay. But you have a clock there that would have the accurate times for these notifications?
THE WITNESS: Yes, sir.
MR. DERVISH: Okay. Thank you.
THE WITNESS: You're welcome.
CHAIRMAN FRANCIS: NATCA?
MR. MOTE: Thank you, Mr. Chairman.
You stated in your answers to Mr. Wentworth a few moments ago that had the approach controller advised you of weather off -- on the final with regard to Korean Air you would advised the pilot of the -- of the special ATIS observation that you had, is that correct?

THE WITNESS: Yes.

MR. MOTE: The special weather at 01:32 -- let me refer, by the way, to Exhibit 3 Foxtrot or the 01:32 special observation page, that form.

(Pause)

THE WITNESS: Which page?

MR. MOTE: It's page F4.

THE WITNESS: Yes.

MR. MOTE: Do you see the approximately four lines down -- five lines down from the top, the special Guam observation, 01:32?

THE WITNESS: Yes.

MR. MOTE: There are rain showers or showers depicted on that special weather observation. Do you see that?

THE WITNESS: Yes, sir. I do.

MR. MOTE: I'm curious to know why you would advise the flight crew of showers on the final if the approach controller told you that but why you would not advise them when you have a hard copy showing showers in the vicinity of the airport. What -- what's the difference?

THE WITNESS: The showers that are located here are not on the final approach course, sir.

MR. WENTWORTH: So, you're -- so you're specifically relating it to the final, is that correct?

THE WITNESS: No, sir. What I -- the reason I would have passed that information would have been the ceiling information.

MR. MOTE: Okay. Thank you, Mr. Chair.

CHAIRMAN FRANCIS: Korean Air?

(The following is a verbatim transcript of the English translation of Captain Kim's questions posed in Korean and Mr. Theobald's responses in English.)

CAPTAIN KIM: Yes, let me ask one question. I'm with the Korean Airlines.

Of the questions that are asked by ATC chairman special weather conditions, why it was not notified to the aircraft -- pilot, the witness said the reason was called --

(Pause)

CHAIRMAN FRANCIS: I think we've got a problem -- hang on just a second.

(Pause)

CHAIRMAN FRANCIS: Go ahead.

CAPTAIN KIM: Among the questions asked by the chairman, the special weather conditions advisory which is not notified of the pilot and the -- why such

notification was not done. The witness answer was that it was because of radar recording matters. Was it also -- would it be interpreted as -- would it be reasonable to interpret your answer as the -- the tasks that you were performing -- you alone were performing were too demanding on any one person?

THE WITNESS: I'm not sure I understand the question as it was stated.

CAPTAIN KIM: Okay. Then, my assistant will ask the question in English.

FIRST OFFICER CHUNG: You -- one of your answers implied that the -- the reason the special observation was not transmitted to the pilot was because you were interrupted in the process, and we're asking if that -- if your answer implies in any way that at particular times during your shift your tasks might be too much for one person. Is that question clear, sir?

THE WITNESS: Yes, it is. And the answer would be no, I don't believe it's too -- too much for one person.

FIRST OFFICER CHUNG: Thank you.

CHAIRMAN FRANCIS: Do you have another question?

CAPTAIN KIM: No. Thank you very much.

(End of translation)

CHAIRMAN FRANCIS: Boeing Company?

MR. DARCY: Thank you, sir. We have no questions.

CHAIRMAN FRANCIS: FAA?

MR. DONNER: Thank you, Mr. Chairman. We have no questions.

CHAIRMAN FRANCIS: Greg?

MR. FEITH: I just have one question regarding the weather, and that is in reading the transcript when Ryan was turning onto the localizer coming in-bound and was asked whether they had seen 801 and they were describing or in the process of looking for the aircraft, they stated that they went -- they just went IMC. And they -- they lost the airport. Did you do anything to get them to provide you a prep of some sort or any update to the weather given the fact that they just went IMC, which apparently wasn't the same condition at the airport? Was there any attempt to update the weather out there that you could provide to following aircraft?

THE WITNESS: I wasn't aware that they went IMC. They were not on my frequency when they were searching for the aircraft.

MR. FEITH: Okay. Thank you.

CHAIRMAN FRANCIS: Pat?

MR. CARISEO: No question.

CHAIRMAN FRANCIS: Ben?

MR. BERMAN: Mr. Theobald, you testified that you didn't make the crash call until you knew a position and location for the crash to send the units to. From whom did you ascertain the position and location and how did that go?

THE WITNESS: That was information that was passed to me by Guam CERAP from Ryan 789.

MR. BERMAN: Thank you

THE WITNESS: You're welcome.

CHAIRMAN FRANCIS: Monty?

MR. M. MONTGOMERY: Thank you -- thank you, Mr. Chairman. I do have one question.

In your tour of duty there at Guam, Mr. Theobald, have you ever received an MSAW alert of any kind?

THE WITNESS: No, sir. I've never worked in that tower when there was a functional MSAW capability in that control tower.

MR. M. MONTGOMERY: Did you ever get a call from approach control with such a message?

THE WITNESS: No, sir.

MR. M. MONTGOMERY: Thank you.

CHAIRMAN FRANCIS: Were you aware that the MSAW was not functional in the approach control?

THE WITNESS: No, sir. I was not.

CHAIRMAN FRANCIS: And could you -- could you just clarify for us a little bit the status of the D-BRITE in your -- in your facility?

THE WITNESS: The D-BRITE was an uncommissioned, unserviceable, non-certified piece of equipment at the time.

CHAIRMAN FRANCIS: So you basically were not using it at all for your ATC duties?

THE WITNESS: No, sir.

CHAIRMAN FRANCIS: Thank you very much.

THE WITNESS: You're welcome.

CHAIRMAN FRANCIS: That's good. Appreciate it.

(Pause)

CHAIRMAN FRANCIS: Mr. Theobald, the same thing applies to you. You're -- you're released now. I understand you want to leave as well.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: All right. Our next witness will be Ms. Sherrie Ewert, air traffic manager,

Barton ATC.

Whereupon,

SHERRIE EWERT

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

SHERRIE EWERT

AIR TRAFFIC MANAGER

BARTON ATC INTERNATIONAL, INC.

AGANA CONTRACT TRAFFIC CONTROL TOWER

MR. SCHLEEDE: Ms. Ewert, please state your full name and business address for the record.

THE WITNESS: My name is Sherrie Lynn Ewert. My business address is 1775 Adamborough Boulevard, Tgin, Guam.

MR. SCHLEEDE: And what is your present occupation?

THE WITNESS: Air traffic manager, Agana, Guam, and air traffic control specialist.

MR. SCHLEEDE: And how long have you held that position?

THE WITNESS: I've been a manager for approximately two years and I've been a specialist with Agana FCT for almost three years.

MR. SCHLEEDE: Would you give us a brief description of your education, training, and experience that brings you to your present position?

THE WITNESS: I went to Navy Air Traffic Control School, a school, from June of '76 to October '76. And then October '79 through November '79 I went to Navy Radar Air Traffic Control Facility school. June '86 to July '86 I went to Navy Facility Management Terminal En Route Procedure school.

I've been stationed at Naval Air Station Fallon; Naval Air Station Siganella, Sicily; again at Naval Air Station Fallon; Naval Air Station Agana, Guam; and then Agana FCT.

And I've been qualifications in flight planning, flight data, clearance delivery, tower visibility, ground control, local control, tower supervisor, radar final control, IFR data, desert data, IFR coordinator, arrival control, approach control, desert control, radar supervisor, facility watch supervisor, on-the-job training instructor, team leader, flight planning chief, tower chief, radar chief, training and standardization, ATCS examiner, control tower examiner, operations duty officer, command training team, facilitator, CPR instructor, air field driving instructor, carrier air group in-briefer,

controller-in-charge, air traffic manager.

MR. SCHLEEDE: Thank you very much. Mr. Wentworth will proceed. Please pause between some of the sentences so that the interpreters can keep up.

MR. WENTWORTH: Thank you. Good morning, Ms. Ewert.

THE WITNESS: Good morning.

MR. WENTWORTH: Based on your qualifications -- I heard you say both manager and controller, so you work as a controller at Guam International in addition to being manager of the facility?

THE WITNESS: Yes, sir.

MR. WENTWORTH: You maintain currency work on a daily basis?

THE WITNESS: Yes, sir.

MR. WENTWORTH: So you're considered a full performance level controller also?

THE WITNESS: Yes, sir.

MR. WENTWORTH: Would you provide for us an overview of your training program and how it's administered?

THE WITNESS: We have a person come into the facility and they have to complete all the courses and take graded tests prior to getting on position. They do on-the-job training. At the completion or what we

hope to be the completion FAA will send over a CTO examiner. They'll be observed and then certified by the FAA.

We continue periodic training, proficiency training as part of the program, which will include refresher training, supplemental training that might come along.

MR. WENTWORTH: Are emergencies and procedures for those emergencies covered as part of your remedial or supplemental training?

THE WITNESS: It's covered under the refresher training.

MR. WENTWORTH: Under refresher. Can you tell me what the average experience or level of experience within the tower is?

THE WITNESS: Approximately 15 years average experience.

MR. WENTWORTH: And out of the --hat -- what is the full staffing complement of the tower, please?

THE WITNESS: The full staffing now?

MR. WENTWORTH: Yes.

THE WITNESS: Seven.

MR. WENTWORTH: And out of that complement, how many have previous experience at Guam International

or Agana when it was under the Navy?

THE WITNESS: The number of people that are there now?

MR. WENTWORTH: Yes.

THE WITNESS: Two.

MR. WENTWORTH: And -- but yet, at the time of the accident Mr. Theobald had previous experience at that facility?

THE WITNESS: Yes.

MR. WENTWORTH: Okay.

THE WITNESS: That would have made it three at the time.

MR. WENTWORTH: Did the staffing or the midnight shift on August 6th, did it conform to the contractual requirements of Barton ATC, the FAA, or both?

THE WITNESS: Both.

MR. WENTWORTH: Both. As a contract facility, to what standards do you provide service to what level?

THE WITNESS: We provide 'em in accordance with FAA and company policy.

MR. WENTWORTH: So, those regulations that are applicable to the FAA controllers also applicable to -- to you?

THE WITNESS: Yes, sir.

MR. WENTWORTH: As a VFR facility, how is D-BRITE radar display used?

THE WITNESS: How is it normally used out of the --

MR. WENTWORTH: Yes. How is it used --

THE WITNESS: -- tower?

MR. WENTWORTH: -- not at the tower itself, but how would it be used?

THE WITNESS: It would be used as an aid to the -- the VFR tower controller. A term that's commonly used is an extension of the eye so you can get a geographical idea of where, like, the aircraft might be.

MR. WENTWORTH: But you do not separate aircraft through the use of the D-BRITE, is that correct?

THE WITNESS: We still don't separate with them the D-BRITE. We -- it would still just be used as an advisory.

MR. WENTWORTH: The two displays that we've been talking about that are currently in the tower, are they commissioned today as we speak?

THE WITNESS: No, sir.

MR. WENTWORTH: If the system is not commissioned, why does the facility log the system in and out of service? I -- I know I had to conduct a review of your facility logs. I noticed that.

THE WITNESS: We log them in the facility to help the FAA AF maintain a history of the status of the equipment.

MR. WENTWORTH: Can you provide us a history during your tenure at least of -- of the D-BRITE, please?

THE WITNESS: At the time that my company started working in the tower, there was a Navy brands in the tower, which is similar to the D-BRITE system. In October of '95 the Navy brands and all associated equipment was removed.

In January of '96 a remote display was installed. That is a display that is displayed up to the Anderson Air Force Control Tower.

In October of '96 there was a group of gentlemen that came out to do an overview for revamping of the control tower. I was told at that time that the D-BRITE system was going to be installed in Guam and that they even knew at that time already where they were going to be getting a system from.

In -- in February of '97 the D-BRITE system was transferred to the FAA.

In between November of '97 and January of '98 digital maps were delivered and it's installed at Agana FTC.

In December of '97 some testing and more software was installed.

In December of '97 the Agana FCT or traffic control personnel received training on the D-BRITE.

And at present FAA AF is continuing to evaluate and optimize the system. The D-BRITE is currently not commissioned or certified.

MR. WENTWORTH: In your view as a manager, does this seem to be an -- extraordinarily long time in getting the system commissioned?

THE WITNESS: Well, this is the first time that I've been a manager and been associated with the FAA, and it's -- it's been an educational time for me to learn how things work.

The duration, I'm not really sure on that. I don't -- I don't have experience with them within this system to say how long it's been.

MR. WENTWORTH: Have you been told when the system is expected to be commissioned?

THE WITNESS: The latest word I have is the end of March, April time frame of this year.

MR. WENTWORTH: Of '98?

THE WITNESS: Yes, sir.

MR. WENTWORTH: Okay. Have you started training your people on the system at this point?

THE WITNESS: We've already received our training and we've already taken our test and we've already received the results back from the test.

MR. WENTWORTH: Has -- have you learned what the status of the D-BRITE was on the morning of the accident?

THE WITNESS: It was not a usable piece of equipment.

MR. WENTWORTH: Okay. When this new system, this D-BRITE system is commissioned, will it have MSAW capability?

THE WITNESS: Would you please ask that question again?

MR. WENTWORTH: When the -- when the D-BRITE system is indeed commissioned, will it have MSAW capability? That is, the ability to provide both oral and visual alerts to the controller?

THE WITNESS: My understanding is it will not.

MR. WENTWORTH: Will the components that would allow these warnings to be issued, will they be present in the system?

THE WITNESS: My understanding is they will.

MR. WENTWORTH: But in essence, inhibited?

THE WITNESS: Yes, sir.

MR. WENTWORTH: Now, is that just the oral or the visual portion?

THE WITNESS: I'm not --

MR. WENTWORTH: Or in total?

THE WITNESS: I'm -- I don't remember about the visual, but I -- the oral is what I remember for sure as being inhibited. I don't recall if the visual will be there or not.

MR. WENTWORTH: As the manager, do you believe that you should have that capability to receive both oral and visual?

THE WITNESS: I'm sorry. I missed the first part of your question.

MR. WENTWORTH: As the manager of the facility, do you believe that you should have the capability of receiving both oral and visual MSAW alerts?

THE WITNESS: My understanding is that FAA policy is that we will not receive oral.

MR. WENTWORTH: Earlier from Mr. Theobald we heard about the search-and-rescue line in the tower cab. And did Barton ATC or the Navy or if you can identify who requested that it be installed?

THE WITNESS: Barton did not request it. We had a similar line that was a Navy line when the Navy was there. That line was removed. I believe the line now is -- was installed by Guam Airport Authority, but I don't know as to what discussion or, you know, how that line came about, who decided to put the line in. I don't have that information.

MR. WENTWORTH: Therefore, you as a facility have no procedures for its use, formal procedures?

THE WITNESS: No, sir.

MR. WENTWORTH: With what frequency at the facility do power outages occur?

THE WITNESS: They happen quite often. Power outages or power hits. It's very common.

MR. WENTWORTH: And when you lose commercial power, what happens? Do you have back-up capability?

THE WITNESS: We have several different backup capabilities. Different components that we have has battery pack. We have a UPS system connected to several items in the tower. And the whole tower is on a generator back-up that is automatic. As soon as it -

- we lose power that starts up.

MR. WENTWORTH: Within the facility who checks the tower clocks, the digital clocks?

THE WITNESS: The FAA AF.

MR. WENTWORTH: And how often is that conducted?

THE WITNESS: My understanding is it's done weekly.

MR. WENTWORTH: Is there a log to that effect?

THE WITNESS: Ask me that again?

MR. WENTWORTH: Is there a log kept to that effect that -- that -- that the check is made?

THE WITNESS: I don't know.

MR. WENTWORTH: Do you know from where the time source is derived?

THE WITNESS: Yes, sir.

MR. WENTWORTH: Can you tell me what that is?

THE WITNESS: It would either be from WWVH in Hawaii or the GPS clock from Guam Center.

MR. WENTWORTH: Who owns the equipment in the tower cab?

THE WITNESS: The FAA.

MR. WENTWORTH: And they're responsible for making sure that it operates correctly?

THE WITNESS: Yes, sir.

MR. WENTWORTH: About what time were you notified of this accident? Do you recall?

THE WITNESS: Ask me that again?

MR. WENTWORTH: About what time were you notified of the accident?

THE WITNESS: Approximately 2:00 in the morning.

MR. WENTWORTH: And who were you notified by?

THE WITNESS: Mr. Theobald.

MR. WENTWORTH: And approximately how long did it take you to get to the facility?

THE WITNESS: Approximately 25 minutes.

MR. WENTWORTH: And what was going on at the tower cab when you arrived?

THE WITNESS: Mr. Theobald was busy working traffic. I can't recall exactly what type of traffic, but I know he was active at the time.

MR. WENTWORTH: Did you assist with any of the notifications?

THE WITNESS: I called -- yes, I verified that some people had been notified. I called CERAP to see if there was anything that they needed me to do, and then I went on from there and notified my company.

MR. WENTWORTH: Have any changes to procedures been made or are anticipated?

THE WITNESS: We've made an additional to our tape. When we change our tapes in the morning we do tape checks. With that we've added where we would tell the time that it is when we do it. That is with the crash phone, and that's at the request of the ramp control supervisor and airport rescue and fire-fighting -- fire chief to help them until they can come up with further procedures for times.

MR. WENTWORTH: Is there any procedure for the controller to call an entity other than the Airport Authority or the crash/fire/rescue station on the airport in the event of an off-base or off-airport accident?

THE WITNESS: No, sir. The procedure is the same.

MR. WENTWORTH: I have no further questions. Thank you.

CHAIRMAN FRANCIS: KCAB?

MR. LEE: Thank you, Chairman.

(The following is a verbatim transcript of the English translation of Mr. Lee's questions posed in Korean and Ms. Ewert's responses in English.)

MR. LEE: Let me just ascertain two things. As of now do you -- staff size at your control center, Agana Control Tower -- to think it's appropriate staff size the contract between FAA and the Barton Company. If we have a chance to review the contract, would we be able to find out the staff size of the controller?

THE WITNESS: I -- that question. Can you please restate it?

MR. LEE: Yes, with respect to the operation of the control tower at the Guam Airport, I believe there is a contract with the FAA. What I'm wondering is the way there the size of the controller staff is also included under the provisions of the contract.

THE WITNESS: My understanding that it is.

MR. LEE: My understanding is that judging by reading of the report, it says that the staff size is supposed to be seven, including the witness and the six others. One is -- I believe one is missing. So, currently, five people are staffing the duty around the clock. Don't you think you don't have a sufficient manpower?

THE WITNESS: I'm not sure I understand the statement. The question was do I have sufficient manpower. Yes, I do. The statement before that I'm not understanding completely.

MR. LEE: I'm looking at the report, the Barton Company as of January 1997. It was taken over by Circor Company. I believe it is in the process of being taken over. Is there still an ongoing process, the company -- Barton Company taken over by this Circor or has it been completed?

THE WITNESS: It's been completed.

MR. LEE: Let me ask you just one more question. Just now you mentioned or Mr. Theobald the controller said that whether the outer mark -- marks were working or not can be done through report from a pilot or FAA notification. Like, in this -- in this fashion, whether certain increment at the control tower navigation aids are not under continuous monitoring it cannot be confirmed on a constant basis. Would you think that it is normal?

THE WITNESS: I don't completely understand your question. The outer marker is not monitored from the tower.

MR. LEE: That the outer marks are in such a state as not to be monitored by the tower, considering the outer marker may not be working at any moment until you receive a report from the pilot, do you think it's normal to resort to ILS landing clearance?

THE WITNESS: I'm sorry, sir. I'm still not understanding the question.

(Pause)

MR. LEE: Outer marks whether they are working or not, the way it can be done is that when it is not working then you have to receive reports from the pilot or you can depend upon regular feedback from the FAA. I believe those are only the two methods, two ways of confirming whether outer marks are working or not. Under such a circumstances at the control tower when you have to clear the aircraft to land, let's say when the outer marks are not working but you would still clear ILS approach or a localizer approach? In other words, I believe you should have at your control tower something you can use to confirm whether outer marks are working or not. That's the point of my question.

THE WITNESS: Sir, we don't clear 'em for ILS approaches. That's done by Guam CERAP. We only clear them to land after they have their clearance for the approach.

MR. LEE: Okay. Thank you very much. That's all.

(End of translation)

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: Yes, thank you.

Just one quick question regarding notification. There was a airport crash exercise in April of '97, I believe the last one they had. Are the controllers normally part of those exercises, especially in relationship to notification?

THE WITNESS: Yes.

MR. DERVISH: Okay. Thank you, Sherrie.

CHAIRMAN FRANCIS: Korean Air?

(The following is a verbatim transcript of the English translation of Captain Kim's response in Korean.)

CAPTAIN KIM: No questions from Korean Air.

(End translation)

CHAIRMAN FRANCIS: NATCA?

(Pause)

MR. MOTE: -- you asked NATCA, Mr. Chairman. I didn't hear that. We have no questions. Thank you.

CHAIRMAN FRANCIS: FAA?

MR. DONNER: We have no questions, Mr. Chairman.

CHAIRMAN FRANCIS: Boeing Company?

MR. DARCY: Mr. Chairman, no questions.

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Thank you very much for your help.

(Pause)

CHAIRMAN FRANCIS: Oh, I'm sorry. I missed this group of people that is surrounding me up here. I -- I could tell that you were enjoying yourselves so much that -- okay.

Greg, I'm sorry.

MR. FEITH: Just one question. Sherrie, can you tell me since the accident, is there now any procedures in place for the controllers if they believe an accident to have occurred off the airport to go down the notification list like they have for on-airport accidents getting off-airport emergency services involved?

THE WITNESS: The procedure is the same that we have.

MR. FEITH: Would you just run through it real quick for me, please?

THE WITNESS: The procedure is to activate the crash phone. On the crash phone is Guam International Airport Ramp Control. They have the list of people that they notify. Also on the crash phone is the Airport Rescue and Fire-fighting. In addition to activating the crash phone we would also notify Center and weather personnel, and then we would go on from there with our -- our notification list that we have. But the procedures are the same on and off.

MR. FEITH: But if you notified the on-airport crash/fire/rescue personnel and it's an off-airport accident, how are you -- how is it ensured that the notification is being made to off-airport emergency response units?

THE WITNESS: We don't ensure that. The procedure is set up with the ramp control and then CERAP.

MR. FEITH: Okay. Thank you.

CHAIRMAN FRANCIS: Monty?

MR. M. MONTGOMERY: I have no questions. Thank you.

CHAIRMAN FRANCIS: Ron?

MR. SCHLEEDE: Yes, thank you. I have a couple regarding the D-BRITE.

I'm not sure we asked you what -- for a fully certified, fully operational D-BRITE what does the local controller use it for. How is it used?

THE WITNESS: Yes, sir. That was asked -- asked, and it was basically the extension of the eyes, an aid to the aircraft -- I mean to the controller.

MR. SCHLEEDE: Okay. If I could ask you then, under the circumstances of Flight 801, a dark night with instrument conditions on the final approach, could you tell us how a controller would -- when he would look at it, when a controller would use the D-BRITE during an approach like that?

THE WITNESS: He would use it when he got the information initially with the in-bound -- with the -- when he was passed the information. Like, on this particular instance, 12-west, there -- the controller would look on the scope for 12-west -- 12-west, correlate it, look out the window, and see if he could see him at that point, and then follow him generally in, look in the win -- out the window, and if he can't see it look back to the scope to try to have -- to correlate it back and forth.

MR. SCHLEEDE: And when the controller looks at the D-BRITE on the scope, what in general is he looking for? A position or altitude?

THE WITNESS: Position, generally.

MR. SCHLEEDE: Do they look at the altitude block? Is it a procedure to look at the altitude block?

THE WITNESS: They could.

MR. SCHLEEDE: They -- I'm sorry?

THE WITNESS: They could.

MR. SCHLEEDE: Okay. But is it a standard practice that they would not only look at the -- the general position but the aircraft's altitude in relation to the approach path?

THE WITNESS: They would look at the position. Then, if they couldn't see the aircraft then I would imagine they would look at the altitude to see if he was, like, higher or lower than what he expected him to be.

MR. SCHLEEDE: Okay. Thank you very much.

CHAIRMAN FRANCIS: Ben?

MR. BERMAN: Ms. Ewert, the Safety Board issued a recommendation to the FAA in December of 1996 that was on a slightly different subject but covered the issue of notification -- post-accident notification, and in -- in March of 1997 the FAA wrote to us and said that it would direct regional air traffic division managers to ensure that actions were

taken to ensure that Order 7210.4 was reviewed and managers would review reference materials, procedures, and letters of agreement to ensure that all emergency notification telephone numbers are available and current, including those for crash, fire, and rescue operations.

Facility managers should notify -- should -- correction. Facility managers should forward the date of completion of the above actions to headquarters air traffic service through division managers no later than March 26th of 1997.

Was the contract control tower at Guam included in this program?

THE WITNESS: I don't recall that.

MR. BERMAN: You have no -- no word of this at all?

THE WITNESS: Not that I remember.

MR. BERMAN: Okay. Thank you.

MR. CARISEO: One quick question. You had mentioned that D-BRITE was expected to be commissioned the end of this month or early April. What was the original schedule for that to happen, or was there one?

THE WITNESS: The original I'm not sure. We've had several dates throughout the time frame.

MR. CARISEO: And what was the earliest date that you recall?

THE WITNESS: The earliest I can remember is December of '97.

MR. CARISEO: Okay. Thank you.

CHAIRMAN FRANCIS: I think now you can leave. Thanks very much. And with you, as the others, if -- if you have to leave --

THE WITNESS: Thank you.

CHAIRMAN FRANCIS: -- you may. And we appreciate what you've contributed.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: I think we'll have -- we've got one more witness, I think, before lunch. It's 12:15, 12:20. Maybe we'll ask Mr. Thomas Howell, acting manager, National Field Support Division, FAA Technical Center, please.

Whereupon,

THOMAS HOWELL

was called as a witness, and first having been duly sworn, was examined and testified as follows:

CHAIRMAN FRANCIS: I think that we'll change here. Apparently this is going to be considerably longer than -- than the other witnesses have been. And given that it's -- it's after 12, I think we'll have

lunch now. And why don't we reconvene here at 1:30. It's 12:25 now, so please everybody be back promptly at 1:30.

(Whereupon, at 12:25 p.m., the proceedings were adjourned for lunch, to reconvene at 1:30 p.m., the same day.)

P R O C E E D I N G S

1:30 p.m.

CHAIRMAN FRANCIS: All right. We're going to start again. And Mr. Schleede has the floor.

Whereupon,

THOMAS HOWELL

having previously been duly sworn, was recalled as a witness and was examined and testified as follows:

TESTIMONY OF

THOMAS HOWELL

ACTING MANAGER

NATIONAL FIELD SUPPORT DIVISION, AOS-600

FAA TECHNICAL CENTER

ATLANTIC CITY, NEW JERSEY

MR. SCHLEEDE: Mr. Howell, please give us your full name and business address for our record?

THE WITNESS: My name is Thomas B. Howell. My address is FAA, Operational Support Service, AOS-600, in care of the William J. Hughes Technical Center, Atlantic City International Airport, Atlantic City, New Jersey.

MR. SCHLEEDE: And what is your present position with the FAA?

THE WITNESS: My present position is manager of the National Field Support Division, AOS-600.

MR. SCHLEEDE: Please give us a brief summary of your training, education, and experience that brings you to your present position? And please try to pause slightly between the sentences.

THE WITNESS: I've been with the FAA since 1967. In 1973 I was trained as an en route automation specialist. And the next 20 years I spent either in en route automation specialty functions or management

functions and operational -- functions in the air traffic environment.

My last air traffic position in 1993 was manager of the Cleveland Air Route Traffic Control Center.

I spent one year detail as a deputy director in the Operational Support Service in Washington, D.C.

Since then I've been in the Engineering Services Division, AOS-600. Our mission as it regards to this hearing is to provide centralized software support for the automated radar terminal systems that have the automated radar tracking system, the ARTS system. We receive requirements from those field facilities, interpret those requirements into software language that we call adaptation, deliver the product back to the field for implementation.

MR. SCHLEEDE: Thank you. Mr. Dunham will begin the questioning, and Mr. Pereira will also have questions from this witness.

Oh, I'm sorry. The reverse.

MR. PEREIRA: Good afternoon, Mr. Howell.

THE WITNESS: Good afternoon.

MR. PEREIRA: Would you please describe the FAA's Minimum Safe Altitude Warning program, also known as the MSAW program, including information about when

and why MSAW was developed?

THE WITNESS: Yes. I -- well, I have prepared a presentation. If I can begin now?

MR. PEREIRA: Please.

MR. SCHLEEDE: This is coming from what exhibit? 13?

MR. PEREIRA: 13 D, Delta.

MR. SCHLEEDE: Thank you.

MR. PEREIRA: Actually, this is 3FF, Foxtrot Foxtrot.

THE WITNESS: What I intend to talk about this afternoon is an overview of the Minimum Safe Altitude Warning system, the purpose that it was designed for, an overview of the history as to why it was developed, a brief description of how it functions, and steps that we have taken to optimize its performance and maintenance.

The Minimum Safe Altitude Warning is a function designed solely as a controller aid in detecting potentially unsafe aircraft proximity to terrain or obstructions. It generates an alert to the controller when a pilot is below or is predicted to be low -- below a specified altitude.

These alerts are generated in two forms: a visual alert that will be displayed to the controller

as a -- a L -- flashing LA in the data block or -- I should say and an oral alert. The oral alert is much like a smoke detector type of alert.

It must be specifically adapted at each one of our 193 Automated Radar Terminal Systems. Each site around the country and in the Pacific and -- and Caribbean that use the Automated Radar Tracking System has special site tripography that has to be included in the adaptation, a local database. Each one of these systems has various amounts and different types of runways, different approaches, different NAV/AIDs, different location of those NAV/AIDs, different numbers and types of airports as well as unique air space requirements that causes each site to be adapted uniquely.

MSAW came about as a result of National Transportation Safety recommendation A73-46. This resulted from an accident December 12th, 1972, Eastern Airlines 1011 in Miami, Florida. Specifically, the NTSB requested the FAA to review ARTS III program for the possible development of procedures to aid flight crews when marked deviations in altitude are noticed by ATC, air traffic control.

In December of 1973 the FAA contracted with Univac to develop hardware and software modifications

necessary to implement this recommendation.

In 1977 MSAW was implemented into the ARTS III program, and in 1990 into the ARTS IIA program. Additionally, we have installed this function into the EARTS system and the en route environment.

Though there are several different types of MSAW processing, today we're going to focus -- this briefing or presentation will focus primarily on the terminal processing. In the terminal environment there are two different types of processing that we'll talk about. One is general terrain warning and the other is approach path monitoring.

However, both of these types of processing require certain things to be present before the aircraft will be eligible for MSAW processing. It must be a tracked target. That is, a flight plan must be entered into the system. It must have a valid mode C or altitude reporting. It must be within the adapted eligibility area. It must be outside any inhibit zones. It also must be in a proper flight status, and by that it's to be -- to receive arrival processing it has to be listed as an arrival in the flight plan.

It also has to have a proper beacon code assignment because there are some areas where we would intentionally inhibit flights from receiving or being

eligible to receive MSAW processing. Those might be cases of military operations, helicopter operations, special VFR operations.

In the area of general terrain monitoring we've got three different types of alerts or alarms that may be presented to the controller. The first one would be the current alarm. Any time an aircraft is presently less than 500 feet above the digital terrain map it will automatically generate an alarm.

We also have prediction alarms. When the pilot would be less than 500 feet above the digital terrain map within 30 seconds -- in advance of the flight course within 30 seconds of the flight trajectory.

We also provide a third type of alarm called a projection alarm. If the pilot will be unable to clear all obstacles within eight minutes flying time on present course at a five degree climb angle.

Before I explain more about those particular alarms, I'd like to briefly mention about what digital terrain maps are. The -- to MSAW processing. The graph that's up on the -- screen is a -- a small sample of a digital terrain map, and each one of our radar sensors that is used in the automated -- in the ARTS system will have a digital terrain map built for it.

So, each sensor -- and we have some of our systems that have multiple -- multiple sensors, but the important thing is that each sensor will have one of these individually built for it.

And each one of these maps consist of 4096 two-nautical-mile bins. And the bin altitudes are expressed in feet. This data is provided and certified by NOAA. NOAA gets this data and builds these maps with data from the National Imagery and Mapping Agency and the coast -- the U.S. Geological Survey. They build the terrain maps.

To these terrain maps NOAA adds the obstacle obstruction layer which will determine the highest obstruction within that two-mile bin.

And I'll just point to one of the bins here. Hopefully you can see that. This bin says 333. Well, that means that that bin -- highest obstruction in that bin is 333 feet mean -- sea level.

Now, our software will add 500 feet to that bin for processing purposes. So, if the aircraft is projected to be within 833 feet we'll generate an alert to the controller.

Each one ofthese -- I -- I need to back up and correct that statement. We -- we actually round off these bins to the nearest hundred feet, the nearest

highest 100 feet. So, in that case that bin would go up to 400 feet. That's an important point to notice. We round those bins up to 100 feet and then we add the 500-foot buffer to that in the software.

Now, back -- back to the -- the different types of alarms. Remember, we had three different types of alarm. We have the current alarm which will generate an immediate alert, all right.

On Point A as used to -- to show a projection, all our aircraft are continually projected 30 -- 30 seconds in advance of its trajectory. If in that -- anywhere along that 30-second route if it's projected to be in a bin below that altitude, the projected trajectory of the aircraft, the alert will be sounded.

Now, there are some exceptions to that. Generally, it will take two consecutive predictions to generate the alert to the controller. Two consecutive projections 30 seconds in advance will generate a alert to the controller. In the MSAW -- terminal MSAW environment we're dealing with 4.75-second radar, so the scan rate is every 4.75 seconds. The projection 30 seconds. Any two consecutive hits will generate an alert to the controller.

Now, we have a -- I'm sorry. That's a -- prediction.

We also from that Point A on the screen we have another -- this is almost a separate type of projection. From that point we are constantly projecting eight minutes in the future at a five degree climb angle to make sure that the aircraft can clear any obstacles in its path.

So, we've got two things going on here. The projection point is continually updated every 4.75 seconds, and from that Projection Point A we're continually projecting 480 seconds into the future at a five degree climb angle to make sure the aircraft can clear any obstacles within its path. If any two scans detect an altitude bin encroachment, we will generate an alert to the controller.

The next area of MSAW alert processing is the approach path monitor. Again, any current violations of the air space will provide an alert to the controller. On the prediction the pilot is projected to be 100 feet below the calculated approach path alarm slope altitude within the next 15 seconds.

Approach path monitors are used to transition aircraft from general terrain monitoring to the airport. These approach path monitor boxes are

generally one mile either side of runway center line. They initiate generally five miles from the end of the runway. They generally will terminate within one mile of the runway. The initiate altitude for the slope will be based upon the D -- the -- the DTM at the initiate point plus 500 feet. The cut-off altitude will be based on any obstructions or the MDA. And we're -- for this purposes, if there's obstructions we will use the MDA minus 100 feet for the lowest non-precision approach for that runway.

It comes into the airport inhibit area, which is normally within one mile of the airport. At some point you have to stop this processing 'cause eventually everybody, we hope, is going to land successfully. So, anything within one mile we find generates a tremendous amount of nuisance alerts.

Also, that's generally the point where we stop tracking and we have our -- our drop track parameter for the -- the system. And we also terminate any alert processing.

Now, I'd like to show you a picture of the Guam adaptation prior to the accident. You will notice the outside ring is a 60-mile ring around the radar antenna. Inside that -- that ring -- there's actually a double line -- a double ring there, and it may be

difficult for you to see that, but there's actually a double ring there. That's only one mile apart.

Processing in this case was enabled between 54 and 55 miles from the radar antenna, effectively inhibited processing within 54 miles of the airport. It also inhibited any approach path monitoring processing. In this situation there were no oral or visual alarms generated within that circle. This resulted from a facility request and has been operational in that condition, as far as we can determine, since February of 1995.

After the accident we had some -- we were on the phone with the folks at -- in Guam two days later to go over what was in the system and we had dispatched some people out there the following Monday. I -- I don't have the exact date, but I think it was in a couple days they had readapted the system. We had removed that double line, enabled the processing within 55 miles, optimized the approach capture boxes, reduced the size of the departure inhibit areas, expanded the airport eligibility, and we are still presently working on trying to eliminate nuisance alerts.

We've learned a lot from this. As a result of -- of this and several other accidents, on October the 3rd, 1990 --

MR. PEREIRA: Mr. Howell?

THE WITNESS: Yes?

MR. PEREIRA: Can I stop you there before we get into the -- the changes after the fact and the review process? Could we go over some questions first, if you don't mind?

THE WITNESS: Yes, sir.

MR. PEREIRA: Okay. Thank you.

(Pause)

MR. PEREIRA: What kind of MSAW systems were in place at the Guam ATC facility at the time of the accident? You had mentioned we had ARTS and EARTS. You mentioned a couple different types of MSAWs. What -- what was in place at Guam at the time of the accident?

THE WITNESS: At the time of the -- the accident the ARTS IIA system was being used for the terminal approach services and the micro-EARTS was being used for the en route environment.

Micro -- I'm sorry.

MR. PEREIRA: It's okay. Could you -- you mentioned the fact that we had a eligibility area problem on the ARTS MSAW. Was the EARTS functioning properly or was it configured properly?

THE WITNESS: Yes, as far as I can tell it was.

MR. PEREIRA: Okay. And did we get any EARTS MSAW alarms for the Korean 801 accident airplane?

THE WITNESS: Yes, we did. We received one -- one alert that was displayed.

MR. PEREIRA: Okay. Teddy, coulyou put up Exhibit 3EE, page two?

(Pause)

MR. PEREIRA: And at the bottom of this page here we have the EARTS output?

THE WITNESS: Yes, that's correct.

MR. PEREIRA: Would you explain the date on this page and what they show regarding the EARTS MSAW processing and the radar scope warnings for KA 801?

THE WITNESS: Yes. At time 15:41:08 there was a projection alert, a software projection calculated for Korean 801. It was a general terrain warning prediction. As I've also mentioned in the -- the prediction for the ARTS IIA program, this is the same thing that it's going to take two predictions to generate an alert to the controller. We had one predicted alert at 15:41:08. Since there was not another alert it did not display to the controller.

However, on 15:42:20 there was a -- an actual alarm in the approach path monitor area. Now, as I -- as I stated before, any actual penetrations will generate an immediate alert. So, the one alert that was generated was 15:42:20 on the Korean 801. I know that there was some confusion around this earlier.

Now, that -- the alert itself is the next -- the last two lines. The MA stands for the MSAW alert that was generated, as you can see, at 15:42:20 for the KAL 802. And that was for the approach path warning.

MR. PEREIRA: Okay. Thank you very much.

You mentioned the ARTS II MSAW eligibility area had been set to a ring, and you showed a graphic of that. When was that -- actually, I think you already answered that. That was the February '95 date of that change, is that correct?

THE WITNESS: Yes, it had the two -- the one-mile ring that was enabled from 54 miles to 55 miles and then as far as we can tell was in operation since February of '95.

MR. PEREIRA: Can you explain why the eligibility area was set as it was and who requested and approved these changes relative to the prior status?

THE WITNESS: I -- I cannot speak to why it was set that way or what the thought processes were. However, it -- up -- at that time local facilities had -- there was no -- no -- national policy in place that would prohibit a facility from doing that. So it was left to the discretion of the local facilities.

MR. PEREIRA: Did they physically make that change in the software there or was it made back at the tech center?

THE WITNESS: That was part of a -- some data that was sent to us the previous fall for -- it was called a site adaptation kit where they fill out a form to describe what their local site environment should be, and we translate that and build a new program and send it out to them. And I think we received the data some time in the fall of '94 and that software package was installed -- it was a new upgrade -- was installed in February of '95.

MR. PEREIRA: Okay. So that process was in place -- that was in place at the time, at this point do you feel that that was appropriate to maintain a proper configuration of the MSAW system? The process that was in place for requesting and -- and -- and carrying out the changes to the MSAW. What's your opinion on the adequacy of that at the time?

THE WITNESS: I really can't speak for the appropriateness of it, but what I can tell you now in this environment, we have taken steps to see that we're going to do business in a different manner and that we're not going to do that anymore. And we've actually designated these type of parameters to be the responsibility of one organization, the AOS organization, that organization that I work for.

MR. PEREIRA: After this accident the FAA performed a simulation of the Guam ARTS IIA MSAW performance, the one that had the eligibility ring. With the eligibility ring removed and in its proper configuration using the Korean Air 801 radar data, would you please describe the simulation further and the results of that simulation?

THE WITNESS: Yes. We do not have the ability to record the ARTS IIA data. We do have the ability to record the Micro-EARTS data. And the Micro-EARTS uses a 12-second radar versus the -- the terminal radar using 4.75. So, we took the data from the 12-second radar and we -- put it into a test target generator and extrapolated the 12-second returns on the flight that we had -- the information that we had for the Korean 801 and fed it into the ARTS IIA program through the simulator.

And it did show that approximately at 1700 feet it would have generated an alarm and it went on for approximately 60 seconds prior to impact -- or prior -- prior to coasting.

MR. PEREIRA: Okay. So, the simulation showed approximately 60 seconds of continual message on the radar scope, is that correct?

THE WITNESS: Yes, being -- through the simulation it did show that.

MR. PEREIRA: Okay. Thank you.

THE WITNESS: Any other questions on the displays before or after?

MR. PEREIRA: No, I think that does it for me. Mr. Dunham has some questions for you now.

MR. DUNHAM: You can go ahead and resume your briefing, and then I will -- I may ask you a question after each slide.

THE WITNESS: Okay.

October 3rd, 1997, FAA established a method for strict configuration management of MSAW. All modifications are now centrally maintained. We've described -- established strict management oversight of these parameters. We've developed guidelines and a review process of quality assurance of how we're going to manage this.

As I mentioned before, each site prior to the -- that date had the authority to make changes to MSAW. Unfortunately, they had limited guidance on how to make those changes. AOS is now the only organization authorized to make changes to this program, the MSAW program.

We have developed common MSAW adaptation standards for all terminal systems. Additionally, those facilities that we find cannot fit into these standards go through a comprehensive waiver review process at the national or Washington level.

I'd like to spend a little bit more talk about this optimization process and steps that we've taken since October the 3rd. We've assembled or we did assemble an interdisciplinary team, chose -- recognize AT and AF experts to develop standards for clear guidance on how to adapt this MSAW.

Prior to that time, the local facilities were left with just a guidance of -- of adapting it. An -- an example might be there -- when they're told how to adapt an eligibility area it could be zero to 60 miles. Now we have developed a standard and said that it's got to be a minimum of five miles beyond your approach air space. It can't be any -- and it's got to -- it can't -- it's got to start at the airport. So, we've

really nailed down the standards and we've -- we've testified some nominal values, and if they deviate from those nominal values it's going to require a waiver.

The initial optimization, we set up a review process to gather all the data. We actually went out and copied all the operational programs in the system and put a team together to review what was actually in the -- the data and the systems. And we developed some tools that would allow us to -- to graphically or -- or -- or put this data -- software data into a picture. So, we go by -- to it and review it and prioritize what need to be done. And then set up a work process to start the review.

And each -- each review process was done by two people and then checked by another two people and then sent to a different organization for a quality review process. And if any errors were found it would stop -- back -- start back in the beginning of the -- the review process.

We also, as I mentioned previously, developed tools to take the program listings and develop it into pictures. That's a real quick way to see what's going on. Unfortunately, had these kind of tools been in the field at the time it would have been probably a different story.

However, technology has just recently allowed us to do this kind of stuff. We've applied new standards to each site. Additionally, we've -- developed and tested site-specific test scenarios for each site for functional verification. So now our technicians, when they do certify these systems, they've got a test scenario to run that would produce hard copy results.

MR. DUNHAM: Okay. Can you talk a little bit about those tools? The two slides previously that showed the illustration of the Guam adaptation, those were created with those tools?

THE WITNESS: That's correct.

MR. DUNHAM: Okay. So that's -- that's the actual data from Guam? That's not a simulation?

THE WITNESS: This is the actual data that's in -- adapted in the Guam system.

MR. DUNHAM: Okay.

THE WITNESS: Now, I said this was the actual data as of a couple weeks ago. All right. Now, we've since -- I'd have to check as to whether this is the optimized program or not, but it's -- it's definitely after the accident. And also we're -- as I said, we're continuing the optimization process of nuisance alerts.

MR. DUNHAM: Okay. And was that re-adaptation, was that flight-checked?

THE WITNESS: I don't have that information.

MR. DUNHAM: Okay. And which -- what sites are included in the 193? What types of facilities?

THE WITNESS: We have 130 ARTS II sites, ARTS IIA sites. We've got 60 ARTS IIIA sites, and three ARTS IIIE sites.

MR. DUNHAM: Can you explain the differences between those facilities?

THE WITNESS: Generally, the -- the -- the IIA system is -- is a basic program. The IIIA system is a little more sophisticated. It has a little more functionality. And the IIIE system is -- is kind of a state-of-the-art solid state advanced system, which would be more of a -- a land type network system distributed -- type processing.

MR. DUNHAM: Okay.

THE WITNESS: Okay.

MR. DUNHAM: Thank you.

THE WITNESS: Again, the one thing I need to mention here is that we -- we actually have re-adapted all of the 193 sites, and that work has been completed. At least half those sites are operational with the -- the new -- new functionality.

MR. DUNHAM: And what does the -- the site-specific functionality tests actually test?

THE WITNESS: It -- it tests the -- it -- it's a random test to see that the software is generating alerts where it's supposed to, that we're getting general terrain warning alerts and we're getting approach path monitor -- alerts. It also tests conflict alert.

MR. DUNHAM: Okay. So that testing is done on every site before the adaptation is sent out?

THE WITNESS: Yes. We test -- we're testing it at the tech center. But we also send out this -- this scenario and this tape along with the new program so that the local people can do their own testing, and they're required to do it on a monthly basis.

MR. DUNHAM: All right.

THE WITNESS: I'd like to talk about just a -- a couple of nation wine -- nationwide findings and fixes that we've uncovered through our investigation of 193 sites.

We reduced a significant amount of inhibited air space. Again, we -- we did not have any specific standards and we've since developed standards which require the rebuild of basically all of our sites to make sure that everybody was in the same conformance

and that we can now configuration manage all of these systems.

An example of some new inhibit standards, in the departure inhibit area we had a range of zero to 50 miles. Now the new standard is two miles from the airport, maybe up to six depending on local conditions. Anything beyond that would require a waiver.

General terrain monitoring didn't have a standard before. New standard: not to exceed five miles from the airport.

Fly-in inhibit areas didn't have a standard before. New standard: on defined airports not to exceed five miles.

We redesigned all the approach capture boxes, -- redefined the initiate and termination points on the digital terrain maps. Previously it was a manual effort to update all these altitude bins -- whenever new obstructions would come in.

On alarm -- approach path monitor slope alarm we've developed guidelines and procedures for what the initiate altitude should be, also what the cut-off altitude should be. Before it was left to local -- discretion. Now we've got strict standards.

MR. DUNHAM: On the approach slope adaptation, was that also added to the EARTS system?

THE WITNESS: The EARTS system does not have approach slope adaptation capability. We have generated a National Transit proposal to incorporate that. Until that -- that case file is approved, we're adapting what we call pseudo-capture boxes, all right, that allow us to, actually like a step-down approach, step down the approach like a stair -- like a ladder stair.

MR. DUNHAM: Okay. And why would you add that adaptation to a system that didn't have it previously?

THE WITNESS: Okay. What we found -- our team in -- in reviewing MSAW and trying to make this as -- as best as it can be that we -- in the ARTS II environment there was two methods of adapting approach box monitors. One was you could adapt a flat plane at -- at the -- the MDA of the lowest non-precision approach minus 100 feet below that approach as -- as a method of adapting approach capture box. Or you could adapt an approach path monitor slope alarm.

Well, we found that it provided much more accuracy to adapt the slope, and we've incorporated that as our standard.

Now, when we first started this process we -- we did not -- we weren't aware that you could put it in

all the systems, and we've since decided to go ahead and put it in all those systems. And we've developed some -- some coding modifications and some change proposals to take action to do that and improve the performance of the system. So -- and our -- our standards, I -- I couldn't tell you exactly how many airports were adapted at the flat plane, but our new standard is to have the -- the approach path monitor slope alarm. And we're in the process of incorporating that nationwide.

MR. DUNHAM: And what's the practical effect of implementing that slope?

THE WITNESS: It'll generate alarms sooner. It'll generate alerts soon -- sooner.

MR. DUNHAM: Okay. And just to clarify, the ARTS IIA system has had that capability longer than the other systems?

THE WITNESS: Yes. ARTS IIA came along in 1990, and if you remember, the IIIA system was 1977. This was kind of the prototype.

MR. DUNHAM: And the -- the IIIA did or did not have that capability?

THE WITNESS: The IIIA -- the IIIA was not released with that capability. We found that there were some coding in there that -- that we can modify

and give it that capability, and we have since rebuilt all the IIIA programs with that new capability.

MR. DUNHAM: Okay. So, your intention at the completion of this will be that all the ARTS systems of any type will have that slope available?

THE WITNESS: They will have that slope available, that's correct. And most of the approaches will have that slope unless there's a step-down approach.

MR. DUNHAM: Okay. Thank you.

(Pause)

THE WITNESS: I'd like to spend just a few minutes to talk about how we're going to maintain this. We have spent a lot of resources and a lot of time getting -- gathering all this data and -- and getting it up to date.

CHAIRMAN FRANCIS: Excuse me. Could -- you talk really fast.

THE WITNESS: Okay. I'm sorry.

CHAIRMAN FRANCIS: I mean I don't know whether you're a former controller or not, but I -- I suspect that these folks in the back of the room are -- having some trouble translating. So, I know it's hard to sort of think about what you're saying and think about speaking slowly, but if you can try to keep that

--

THE WITNESS: Okay.

CHAIRMAN FRANCIS: -- help that.

THE WITNESS: Thank you. I'll slow down.

We've spent a lot -- lot of time and resources and efforts in -- in getting this program up-to-date and -- and optimizing it to make it everything that we -- we think that it can be. So, we certainly don't want to let it fall back in any -- any form of disrepair.

We're going to establish a process where we can by automation tools build new digital terrain maps every 28 days. We've already contracted with -- with NOAA to put a piece of equipment on line that can generate these digital terrain maps for us. And we can just pull 'em down and -- and compare for any changes, and if there are any changes we'll just build a whole new map and send it out to the facility each month.

Every year we -- we plan to review every site -- excuse me. We also are going to be reviewing every new and amended standard intimate approach procedure to check for any obstacles. Since we've adapted the glide path concept we have to -- check any changes to those runways.

We're going to conduct yearly site adaptation review with -- specifically to review these parameters and make sure these systems are adapted properly. We'll divide up all 193 sites by 12 and do so many per month on a review basis annually.

Resources and processes are available 24 hours a day. We've got a 24-hour help -- help line. We're going to establish a team at the tech center. Their sole function will be to take care of MSAW. We're going to get experienced field people that work well in a team environment that are technically competent and conceptually understand ATC procedures. We also intend to use modern software technology practices as much as possible and our requirements -- management project tracking configuration management and we're going to use peer reviews for a defect prevention process.

MR. DUNHAM: Okay. By your use of the digital terrain maps from NOAA you've effectively out-sourced the basis of your adaptation. Have you satisfied yourself that their processes are suitable to base your MSAW processing on?

THE WITNESS: Yes, we have. I've had a couple of specialists over there talking with NOAA, and they're satisfied with the -- the quality control that

they're using.

MR. DUNHAM: And will you be looking into that periodically yourself to make sure that it doesn't deteriorate over time?

THE WITNESS: Sounds like a good idea. We'll put that on the list.

MR. DUNHAM: Okay.

(Pause)

THE WITNESS: In summary, we -- we feel this is very important to our organization. We've taken action to centralize the oversight and management of this program. We've developed standards and guidelines. We've developed new tools. We've streamlined the process. And we're going to continually look for ways to improve this program.

And that concludes my presentation.

MR. DUNHAM: Okay. Can you back up to the slide that shows the approach path monitor boxes?

(Pause)

MR. DUNHAM: That one. Could you just go through that slide and discuss which of those elements would be considered a user-defined site variable as MSAW was being managed at the time of the accident?

THE WITNESS: Everything that's on that slide would be a user-defined variable. As far as the

initiate point of the boxes, the width of the boxes, the altitudes, whether it was a slope or whether it was a flat plane, the general terrain maps. The general terrain maps were originally sent from NOAA but they required updating. That was also a -- a locally generated task to update those maps and those bins. Anytime a bin would change they'd have to calculate what the new altitude was and then patch it into the program.

The inhibit areas around the airport was locally generated. Everything on that slide was locally generated and controlled.

MR. DUNHAM: Okay. Thank you.

After the accident AOS sent a team to Guam and you explained what they -- the work they did after they got there. When was the MSAW system on the ARTS IIA returned to service after the team had arrived? Just roughly.

THE WITNESS: I don't have the exact date, but I -- I think it was within five days of their arrival.

MR. DUNHAM: Okay. And how long had the MSAW been out of service prior to that? That was all the way back to the February of '95 date?

THE WITNESS: Well, technically, I mean it was processing that one-mile gap, okay, since February of '95. And until our team arrived there it was just -- it was still processing that one-mile gap.

MR. DUNHAM: Okay.

THE WITNESS: Then when they left that -- that first week, then it was processing normally.

MR. DUNHAM: Okay. Are you aware of any problems they may have had with acquiring a digital terrain map between 1995 and the time of the accident?

THE WITNESS: No.

MR. DUNHAM: Okay. When the team put in the revised adaptation, did they have to make any program changes to the ARTS IIA system?

THE WITNESS: Not that I'm aware of.

MR. DUNHAM: Okay. So, there was no technical reason that the adaptation they put in after the accident could not have been used prior to the accident?

THE WITNESS: Not that I'm aware of.

MR. DUNHAM: Are there any inhibited areas in the current effective latest version of the Guam adaptation?

THE WITNESS: No volume inhibit areas. There's some departure inhibit areas that are a couple

miles from the airport, which is a routine thing.

MR. DUNHAM: Okay. But effectively, areas that are analogous to the 54-mile radius area are no longer used?

THE WITNESS: That's correct.

MR. DUNHAM: Okay. Has the CERAP reported any false alarm problems with the new adaptation?

THE WITNESS: Yes, they have.

MR. DUNHAM: Okay. What's the process for analyzing and minimizing the problems from those?

THE WITNESS: Along with the -- the release of the new program tape we've also put in a program modification that prints out a copy -- hard copy of all the -- the alerts so that when a site does complain about false alerts they can -- they can fax the hard copy to us and we can quickly look at it and find out where these alerts are being generated.

Right now it's my understanding there's a -- a major portion of these alerts at Guam are when the aircraft are being turned on visual approach and turning on base lag. We've analyzed that and we think that we can improve that situation.

MR. DUNHAM: So the technical means for eliminating false alarms have been in the software all along?

THE WITNESS: Could you please repeat that?

MR. DUNHAM: The technical means for eliminating false alarms, the tools you'd use, the -- the functions of the software that you're planning to use are not new? They've been available since ARTS IIA was put in?

THE WITNESS: Yes and no. The -- some of these tools have just developed so that we can easily look at it. Prior to that it was a very cumbersome process to try and analyze those results.

MR. DUNHAM: Okay. But they -- the program itself has had the capability?

THE WITNESS: Yes.

MR. DUNHAM: Okay. Given that that alternative process exists, is there any reason that -- any technical reason that the 54-mile radius inhibit area was the only alternative available before that?

THE WITNESS: Could you restate that question?

MR. DUNHAM: Yeah. At the time of the accident we had a 54-mile circle of inhibited area at Guam because of false alarms. There are alternatives available to that approach, are there not?

THE WITNESS: Yes.

MR. DUNHAM: Okay.

Okay. Teddy, could we have O1 please?

For the record, Exhibit O is a briefing that was presented to NTSB on January 29th, 1998, regarding the progress of the MSAW review team.

(Pause)

MR. DUNHAM: And Mr. Howell, is this -- is this slide inaccurate in any way?

(Pause)

THE WITNESS: That's correct.

MR. DUNHAM: Okay. Thank you very much.

Do you feel that adequate resources have been allocated to the MSAW review to ensure that it's thorough and complete?

THE WITNESS: Yes, I do.

MR. DUNHAM: Okay. Have you had any problems getting support for the effort from FAA?

THE WITNESS: No, I haven't.

MR. DUNHAM: Okay. What is the level of MSAW training and expertise required for proper understanding and management of the software?

THE WITNESS: I believe each one of the automation specialists had received a minimum of eight hours worth of training in this area along with several other hours about adaptation. So, it doesn't really --

they're receiving adequate training right now.

MR. DUNHAM: Okay. How about at the time of the accident?

THE WITNESS: It's also my opinion that they received adequate training.

MR. DUNHAM: All right. What were the most serious problems identified in the -- the review that your people have found?

THE WITNESS: The -- probably the most serious were the amount of inhibit areas and how some of the inhibit areas were adapted.

MR. DUNHAM: And how many sites had that sort of problem?

THE WITNESS: There was -- was four.

MR. DUNHAM: Okay. And when will a -- a final report on the outcome of the review be available?

THE WITNESS: Within 60 days.

MR. DUNHAM: How confident are you that upon completion of the review MSAW will be properly configured and managed at all FAA facilities?

THE WITNESS: Very confident. We plan to use software engineering institute capability maturity model processing for the maintenance of this system.

MR. DUNHAM: Okay. And that's a formal software management process?

THE WITNESS: That's correct.

MR. DUNHAM: Okay. Have there been any changes to the ARTS IIA documentation as a result of the review?

THE WITNESS: Yes, there have. We've developed new standards.

MR. DUNHAM: Okay. Prior to that what level of detailed guidance was available to the ARTS II automation specialist? You described it as -- as sort of general. Can you expand on that?

THE WITNESS: No, I -- probably the -- the best example would be, you know, just how to adapt it, not what the standard would be. Maybe it would be like a speed -- knowing that the car can go zero to 100 where are the optimum value, perfect driving range would be should be 55.

So, we've -- in, like, the general terrain monitor inhibits, it could be any value. It just said you could adapt from zero to 50 miles. Now we've said it can't go any farther than five miles away from the airport. And it must include the air space five miles outside the approach air space.

So, what we're trying to do is -- is to really have a hard and fast standard.

MR. DUNHAM: Okay. And what was the -- the major difference between the ARTS IIA documentation and the ARTS IIIA documentation prior to the accident?

THE WITNESS: The ARTS IIIA had a little bit more -- specificity and had some nominal values suggested in some of their parameters.

MR. DUNHAM: Was there any use of the ARTS IIIA documentation to obtain proper values for ARTS IIA systems prior to the -- the accident?

THE WITNESS: I -- I would say probably because some of the -- the technicians that developed the IIA documentation and standards were also trained in IIIA, so they had experience with IIIA systems.

MR. DUNHAM: Is there any technical difference in the way that inhibit areas are adapted under ARTS IIIA and under ARTS IIA?

THE WITNESS: No. We're applying the same standard for all airports regardless of the system.

MR. DUNHAM: Okay. How about prior to the accident?

THE WITNESS: Yes, there was.

MR. DUNHAM: There was a difference between the two?

THE WITNESS: Yes. In -- the main difference being one system had a standard and the other didn't.

MR. DUNHAM: Okay. But as far as the -- the program operation itself, was the adaptation essentially identical or were there differences?

THE WITNESS: It was very similar.

MR. DUNHAM: Okay. So, if a -- an ARTS IIA technician was looking at the IIIA documentation for inhibit areas would he be able to follow that and achieve it under an ARTS IIA system?

THE WITNESS: Probably.

MR. DUNHAM: Okay. Take a look at Exhibit 3R.

(Pause)

MR. DUNHAM: Okay. This is a recommendation from the Safety Board for November 21st, 1994, regarding the crash of a Lear jet at Dulles Airport. Could you refer to that and explain to us the MSAW adaptation problems that were identified in that recommendation?

THE WITNESS: Yes, I believe this is -- was the wrong MDA used for the calculation approach on runway -- runway 1-right where they used the MDA altitude of the precision approach instead of using the MDA of the non -- the lowest non-precision approach. Resulted in a -- an error in that adaptation.

MR. DUNHAM: Okay. And was there a specific standard applicable to that -- to the Dulles system at the time of that accident?

THE WITNESS: Yes, there was.

MR. DUNHAM: Okay. And it -- this was not in compliance with that standard?

THE WITNESS: That's correct.

MR. DUNHAM: Okay. At that time the Safety Board asked the FAA to "conduct a complete national review of all radar environments using MSAW systems. This review should address all user-defined site variables for the MSAW programs that control general terrain warnings as well as runway capture boxes to ensure compliance with prescribed procedures."

As someone familiar with MSAW systems, is the meaning and intent of this recommendation clear to you?

THE WITNESS: It is to me.

MR. DUNHAM: Okay. Did the FAA conduca review in response to that safety recommendation?

THE WITNESS: Yes, they did.

MR. DUNHAM: What guidance was available reference that review to the local facilities to assist them in ensuring that their MSAW settings were correct?

THE WITNESS: One of our organizations in February of '95 put out a -- a memo to the regional

division managers with that exact same verbiage to check the parameters -- site variable parameters on MSAW. And it appears that there was a diligent effort by the Washington office that had that responsibility to track and report the progress. And there was some indication that each facility reported back.

We have since learned that that's probably not the best way to do that type of thing. And unless we have to go out and do what we just did as far as getting a copy of all the program tapes and have an independent assessment is the only way that we can accurately assure ourselves what's in those systems at that time.

MR. DUNHAM: Okay. So it's your opinion that that review was not in fact effective in identifying the existing problems?

THE WITNESS: Not effective.

MR. DUNHAM: Okay. On -- if you could look at Exhibit 3Q.

(Pause)

THE WITNESS: Got it.

MR. DUNHAM: Okay. This is a report from AOS on a -- their analysis of an accident that occurred on January 13th, 1998. It was another Lear jet crash on approach to runway 2-6 at Houston Intercontinental

Airport. Mr. Howell, are you familiar with this accident?

THE WITNESS: Yes, I am.

MR. DUNHAM: Okay. ASO examined the adaptation for Houston in use on that date. Can you explain what was found?

THE WITNESS: Used the wrong MDA. Used the wrong approach MDA.

MR. DUNHAM: Okay. So how do those problems relate to the problems found at Dulles in 1994?

THE WITNESS: Same problem.

MR. DUNHAM: Okay. Do you know how long the Houston MSAW parameters had been set in that way?

THE WITNESS: No, I don't.

MR. DUNHAM: Is the -- there any evidence at all when it might have been put in or has it been lost to -- lost in the records?

THE WITNESS: I don't have any information about that.

MR. DUNHAM: Okay. Were there clear standards for ARTS IIIA MSAW adaptation available prior to that accident?

THE WITNESS: Yes, there were.

MR. DUNHAM: Were those standards followed?

THE WITNESS: No, they weren't.

MR. DUNHAM: Okay. Should this problem have been detected in the 1994 review?

THE WITNESS: Yes, it had -- yes, it should.

MR. DUNHAM: Okay. How important is the proper functioning of MSAW to AOS?

THE WITNESS: Very important.

MR. DUNHAM: And why is that?

THE WITNESS: Safety critical item.

MR. DUNHAM: Okay. So it provides a safety critical function to the system?

(No response)

MR. DUNHAM: Okay. I have no further questions.

(Pause)

CHAIRMAN FRANCIS: KCAB?

MR. LEE: Mr. Chairman, -- no questions, thank you.

CHAIRMAN FRANCIS: NATCA?

MR. MOTE: No.

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: Just a very minor question, Mr. Howell. You'll have to excuse me. I need more clarification than most.

When you said prior to October of '97 the local facility had the option of installing or modifying the software, what do you mean by local facility? Is that the CERAP or is that --

THE WITNESS: Yes.

MR. DERVISH: So it was the FAA CERAP that modified the Guam --

THE WITNESS: They had the --

MR. DERVISH: -- software?

THE WITNESS: -- the -- they could modify the -- the ARTS IIA program.

MR. DERVISH: Yeah. 'Cause you said in '95 it was modified, new software.

THE WITNESS: Could you repeat this question? I'm not sure that I understand what you're --

MR. DERVISH: Yeah. You -- you keep referring to the local facility, and you said prior to October of '97 the local facility had the option of modifying the software for the MSAW and that -- you also said that in 1995 it was modified at Guam. Who is the local facility that modified that software that created that double inner ring?

THE WITNESS: Okay. The -- the adaptation.
MR. DERVISH: The adaptation, okay.
THE WITNESS: The requirements come from the facility.
MR. DERVISH: Okay. And who's --
THE WITNESS: To the -- to the tech center.
MR. DERVISH: Are we talking about the Guam Airport Authority? Are we talking about the --
THE WITNESS: FAA facility.
MR. DERVISH: Okay. So it is an FAA decision?
THE WITNESS: FAA facility, yes.
MR. DERVISH: Okay. Thank you.
THE WITNESS: You're welcome.
CHAIRMAN FRANCIS: Just -- just to pursue that for a second. How would that work within the facility? I mean would that come to -- to the tech center via AF because of an AT requirement in terms of false alarms or how would that have worked internal to -- to the CERAP?
THE WITNESS: That would come from AT to the tech center.
CHAIRMAN FRANCIS: From AT?
THE WITNESS: From AT.

CHAIRMAN FRANCIS: With AF not involved in it then?

THE WITNESS: No.

CHAIRMAN FRANCIS: Okay. Thank you.

Boeing Company?

MR. DARCY: Mr. Francis, we have two questions.

The first one is can you explain, Mr. Howell, why there was a visual but not an oral alert on the Micro-EARTS implementation?

THE WITNESS: Yes. The oral alert on the Micro-EARTS has a -- parameter value of zero to 200-some seconds to display or sound the alarm for that many seconds. The alarm was -- value was set to zero.

MR. DARCY: Do you -- oh, okay. I think I understand.

And the second question I guess is, is it correct to assume there was a -- different adaptation for the Micro-EARTS and the ARTS IIA? And if so, why were they done differently?

THE WITNESS: The concept is the same. They're just adapted differently. The ARTS -- the Micro-EARTS does not have a digital terrain map capability to use the -- the digital terrain maps, the bins, the two-mile bins. But they do have the ability

to adapt approach capture boxes.

MR. DARCY: Okay. Would that -- would that result in -- or the -- the Micro-EARTS not being adapted the same way, would that result in nuisance alerts on that system that -- that didn't occur on the ARTS IIA?

THE WITNESS: Not necessarily.

MR. DARCY: Can you explain why that would be for -- for me? Sorry, I don't quite get it.

THE WITNESS: Well, one system uses digital terrain maps for -- for general terrain warning, and the other system would develop its -- its base altitude off of minima of our altitude charts in the form of polygons.

MR. DARCY: Okay. I see. Thank you. That's all the questions.

CHAIRMAN FRANCIS: Korean Air?

CAPTAIN KIM: I have one question by my assistant.

FIRST OFFICER CHUNG: Thank you for allowing us to ask you some questions.

The first one is a -- a point of clarification. When you just answered to our Boeing party about the setting being zero, is that in -- in essence saying that the setting was turned off?

THE WITNESS: It was functioning for zero seconds so there was no alert -- there was no oral alarm generated.

FIRST OFFICER CHUNG: But you would not say that this is exactly the same as saying that it was turned off?

THE WITNESS: That's correct.

FIRST OFFICER CHUNG: Thank you.

And follow-on to that question would be if that is the case, can you give us a reason for that? Why it was set at zero?

THE WITNESS: Yes, because that system in Guam, the Micro-EARTS is predominantly used for en route operations. And there is no requirement or no policy for an oral alarm in the en route environment. They use the IIA system for the route -- approach processing.

FIRST OFFICER CHUNG: Thank you. You'll pardon us asking one more uneducated question. Most of us are not familiar with the system, and regarding something you mentioned. I believe it was during optimization you said the technology to achieve this -- and it was -- seems to be done -- had been done rather quickly -- that the technology only recently became available. Were you referring to that -- with

adaptation or -- I'm sorry, or with optimization?

THE WITNESS: Well, the tools that we have used to optimize the systems when -- when Micro -- when MSAW was developed back in the '70s and early '80s we didn't have flight PCs, and now we're using PCs to quickly analyze this data and paint -- or develop pictures that somebody can visually look at. Before they were just looking at software coding. Very hard to analyze.

FIRST OFFICER CHUNG: So you were referring to adaptation and not optimization when you said recently?

THE WITNESS: Optimization of the adaptation.

FIRST OFFICER CHUNG: And a date of around 1990 was mentioned. What was that in reference to? Optimization of adaptation was -- technology became as early as 1990, is that our understanding or --

THE WITNESS: No, in 1990 MSAW was put into the ARTS IIA program.

FIRST OFFICER CHUNG: Okay. When you said recently, then could you put a date or a year on the recent technology that makes the optimization process available today?

THE WITNESS: We used PC technology in the fall of this year to develop the -- the tools necessary

to optimize the programs. Of -- we could have done it other ways, but now we've got tools that we can do it quickly.

FIRST OFFICER CHUNG: Did you say fall of last year was really the first time this optimization process could have taken place?

THE WITNESS: That's hard to answer. I guess it could have taken place a little bit sooner.

FIRST OFFICER CHUNG: Okay. Thank you very much.

CHAIRMAN FRANCIS: FAA?

MR. DONNER: Yes, Mr. Chairman, I have just one question for Mr. Howell.

Sir, earlier you mentioned that the alert at 15:42 and 20 seconds was displayed on the radar but I don't believe you said whether or not that was the only time that there was an alert displayed on the radar. Was it?

THE WITNESS: That was the only time the alert was displayed on the radar.

MR. DONNER: Thank you.

CHAIRMAN FRANCIS: Mr. Feith?

MR. FEITH: Just a couple of follow-up questions, one regarding the EARTS MSAW.

Had the EARTS MSAW had an approach slope warning capability like the -- the ARTS II did, is it likely that we would have gotten a warning much earlier than the six-second time period that we did have?

THE WITNESS: No.

MR. FEITH: Can you tell me why?

THE WITNESS: The distance from the airport would not have changed. So, it was -- the penetration point at the distance from the airport that triggered that alarm more so than the altitude of the slope.

MR. FEITH: You had answered a question. I think it was for Mr. Dunham regarding the rehab -- readaptation and -- and if the readaptation site at Guam when it was -- or I should the readaptation that occurred at Guam hadn't been flight checked. First off, why not? And second off, how do you validate the -- the -- the new software change if it isn't flight checked?

THE WITNESS: Well, let me correct this. Not -- I -- I have no knowledge of whether it was flight checked or not.

MR. FEITH: Okay.

THE WITNESS: So, I -- I can't say no, it wasn't flight checked. I have no knowledge of whether it was or not. Maybe somebody else can answer that

question.

MR. FEITH: Do you know if any of the other readapted sites had been flight checked?

THE WITNESS: Yes, I do.

MR. FEITH: Is that a typical practice to validate the new software changes?

THE WITNESS: Yes, it is.

MR. FEITH: You had mentioned something about a waiver that had -- had been issued or is issued when a site wants to change the parameters for the -- the MSAW. Do you -- Guam was issued a waiver?

THE WITNESS: I don't know.

MR. FEITH: Okay. Very good. Thank you. That's all I have.

CHAIRMAN FRANCIS: Pat?

MR. CARISEO: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Ben?

MR. BERMAN: Mr. Howell, you mentioned that the -- the false alarm problem at Guam is -- is -- is fixable, is that correct?

THE WITNESS: I think we can improve it.

MR. BERMAN: When will -- when will that be completed?

THE WITNESS: Should be a patch on the way out there this week.

MR. BERMAN: Okay. One more thing. I wanted to just get some clarification on an answer you gave to Mr. Feith a minute ago about the -- the difference between the EARTS MSAW approach slope warning and not having that feature. If -- if the approach slope warning wouldn't have provided additional assistance here in the case of EARTS, why would the ARTS II have provided 60 seconds of warning if it had been working correctly?

THE WITNESS: I believe the aircraft penetrated the side of the box. It didn't descend into the box. It penetrated the side of the box.

MR. BERMAN: Okay. I think I understand.

(Pause)

MR. M. MONTGOMERY: Thank you, Mr. Chairman.

Mr. Howell, let me ask you what I hope is a rhetorical question. In the development of the replacement systems for the ARTS programs, the common ARTS, which is now under way, and soon to be the STARS system, we hope, is your office working with these programs to make sure that all these improvements that you've made in the ARTS II and ARTS III systems will be maintained and promulgated?

THE WITNESS: Yes, definitely. We are very closely related and working with them on these -- this

issue.

MR. M. MONTGOMERY: Okay. Thank you. No more questions.

CHAIRMAN FRANCIS: Let me -- I don't have any questions. Let me make a little editorial personal comment here.

I think that this exchange that we just had is -- is exactly what I was talking about this morning in terms of people cooperating together to try to make the system safer. Mr. Howell has been professional, candid, forthcoming, and constructive, and I think that our questioners Charlie and Scott with the assistance of Richard Wentworth have -- have also handled this very well. And I -- I appreciate it. I think that's in everyone's interest that -- that something that is as sensitive as this and could have been as difficult has been as productive for -- for all of us. Thank you very much.

THE WITNESS: You're welcome.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: Our next witness -- you're free to -- our next witness, David Canoles, manager, Evaluations Investigations Staff, AAT-20.

(Pause)

CHAIRMAN FRANCIS: Oh, I'm sorry. I'm on the wrong -- missed one here. Sabra Kaulia, deputy director, Air Traffic Operations Programs, FAA in Washington.

Whereupon,

SABRA KAULIA

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

SABRA KAULIA

AIR TRAFFIC OPERATIONS PROGRAM, ATO-2

FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C.

MR. SCHLEEDE: Please state your full name and business address for our record?

THE WITNESS: My name is Sabra Kaulia. Business address is 800 Independence Avenue, Southwest; Washington, D.C.

MR. SCHLEEDE: And you work for the FAA?

THE WITNESS: Yes, I do.

MR. SCHLEEDE: In what position?

THE WITNESS: I'm the deputy program director for Air Traffic Operations.

MR. SCHLEEDE: Okay. Could you give us a brief summary of your training, education, experience that brings you to your present position? And again, please try to speak slowly and pause between the sentences.

THE WITNESS: I have 27 years of experience air traffic control, including six operational air traffic control facilities both in the en route and the terminal environment, positions as a supervisor, staff support specialist, Washington headquarters and regional. Facility management, both assistant management and manager time. Regional air traffic assistant division manager and now deputy program director.

MR. SCHLEEDE: Thank you very much.

Mr. Dunham?

MR. DUNHAM: Good afternoon. Could you please -- sorry. Could you please explain from a operational perspective the reasons for having MSAW functions in air traffic control software?

THE WITNESS: The MSAW system is a function of our Automated Radar Processing System. That is a tool to assist the controller by providing information

so they can help the pilot avoid terrain and/or obstructions.

MR. DUNHAM: Okay. And what's the role of MSAW in the prevention of CFIT accidents?

THE WITNESS: To provide the controller with an additional alert, an automated alert through that processing regarding aircraft proximity, potential proximity to terrain or obstructions.

MR. DUNHAM: Okay. And this software is in use in both en route and terminal facilities?

THE WITNESS: Yes, it is.

MR. DUNHAM: Okay. If a radar controller inadvertently cleared an aircraft to operate below the minimum IFR altitude for the area it was in in close proximity to either terrain or obstructions, please describe the various ways that error might be brought to their attention.

THE WITNESS: The read-back from the pilot could bring that altitude to their attention. The observance of the aircraft proceeding into an area below their depicted altitudes on their radar scope could do that. And also, the MSAW system could do that.

MR. DUNHAM: Okay. Number two and three are actually the same thing, are they not?

THE WITNESS: Not necessarily. I believe number two, what I was referring to is the observance of the target of the aircraft and its altitude reference the altitude that you either thought you had issued or would have issued, not the alert itself, the low altitude flashing in the tag.

MR. DUNHAM: Okay.

THE WITNESS: The third was that one.

MR. DUNHAM: Okay. Could you look at Exhibit 3I3? I'm sorry. Page three.

THE WITNESS: Yes.

MR. DUNHAM: And just read us the part there about safety alerts. We've had a couple of paraphrases of it today, but I thought we should get the exact words.

THE WITNESS: You want me to read the paragraph for safety alert?

MR. DUNHAM: Yeah, and just explain what -- what safety alerts are.

THE WITNESS: Paragraph 2- -- 1-6, safety alert. "Issue a safety alert to an aircraft if you are aware the aircraft is in a position slant altitude which in your judgment places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the

situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued. Inform the appropriate controller."

MR. DUNHAM: Okay. And -- and what priority does that fall under in the controller's overall workload?

THE WITNESS: This is a first priority.

MR. DUNHAM: And it's equivalent to what?

THE WITNESS: Control instructions.

MR. DUNHAM: Separation of aircraft?

THE WITNESS: Yes.

MR. DUNHAM: Yes. So -- so, separation and safety alerts are equal priority?

THE WITNESS: First priority.

MR. DUNHAM: Okay.

THE WITNESS: Yes.

MR. DUNHAM: Is an MSAW activation an event that could cause a controller to issue a safety alert?

THE WITNESS: Yes.

MR. DUNHAM: Okay. So then, responding to an MSAW alert under some circumstances could be a first priority duty?

THE WITNESS: If in the controller's judgment there was an unsafe situation, yes.

MR. DUNHAM: Okay. And what of the possible consequences of MSAW misconfiguration or malfunction?

THE WITNESS: In the absence of processing we would not have this additional alert system and/or automated process available.

MR. DUNHAM: Okay. So do you believe that MSAW makes an important contribution to the overall level of safety in NAS operations?

THE WITNESS: Yes, I do.

MR. DUNHAM: Okay. Could you look at Exhibit Z 32? Z like zebra.

(Pause)

THE WITNESS: 3Z?

MR. DUNHAM: That's correct. 3Z 32.

(Pause)

MR. DUNHAM: Sorry. I'm a little slow dredging it up myself.

(Pause)

MR. DUNHAM: Okay. Paragraph 5-2-2, item classification?

THE WITNESS: Yes.

MR. DUNHAM: Number D says problem. Now, this is an explanation of how items are classified on a

facility evaluation report. Could you explain to us what the definition of a problem is as shown here in this order?

THE WITNESS: I could read that to you, but I believe that really is outside my expertise. This is --

MR. DUNHAM: Well, we could --

THE WITNESS: -- the evaluations.

MR. DUNHAM: Go ahead and read this and then we'll -- we'll talk about that.

THE WITNESS: Okay And specific under D you wanted to hear which part?

MR. DUNHAM: The definitions of problem items.

THE WITNESS: "Problem items are those (A) items identified that are in contradiction to national, regional, hub, or facility directives. The specific refer -- reference shall be noted at the end of each problem description. (B) Items not governed by specific references but which clearly and negatively affect performance programs, quality of service, or efficiency. (C) Items identified as hub, regional, or national in scope, the resolution of which requires action above the facility level."

MR. DUNHAM: Okay. That's fine.

Do you feel that loss of MSAW functionality meets the Section B, there the -- that it clearly and negatively affects quality of service?

THE WITNESS: Again, I'm not sure -- that is outside of my area of expertise. I'm not sure I could respond to that.

MR. DUNHAM: You've been an operational facility manager, correct?

THE WITNESS: Yes, sir.

MR. DUNHAM: And you're responsible for the quality of service of the facility you're running?

THE WITNESS: Yes, sir.

MR. DUNHAM: Okay. So, in that case, if you -- your facility lost MSAW functionality, would you consider that clearly a negatively affecting the quality of the service?

THE WITNESS: Depending on the facility I was in and the guidelines and national requirements I was given it would determine whether it would fit under that evaluation category.

MR. DUNHAM: I'm -- I'm not --

THE WITNESS: It's a broad scope.I'm sorry.

MR. DUNHAM: I'm not asking you to evaluate it. I'm just saying as a -- as an operational manager,

would you feel that was a problem for your facility?

THE WITNESS: I would not use that word. I would consider it serious.

MR. DUNHAM: Okay. Is the overall level of safety in AT system related to the quality of service it provides?

THE WITNESS: I'm sorry. Could you repeat that?

MR. DUNHAM: Is the overall level of safety in the ATC system related to the quality of service that it provides?

THE WITNESS: Yes.

MR. DUNHAM: Okay. Could you explain how loss of ATC terrain warnings for both pilots and controllers affects quality of service?

THE WITNESS: Specifically meaning the MSAW service?

MR. DUNHAM: Yes.

THE WITNESS: It is a secondary activity, a secondary piece of information that would be missing. So, the additional service of MSAW would be missing. That would be the impact.

MR. DUNHAM: Does that have any effect on safety?

THE WITNESS: I think the -- it would be an absence of an additional system. I'm not sure I understand your question. I'm sorry.

MR. DUNHAM: Does MSAW have any effect on the safety of the system?

THE WITNESS: It assists the controller. It enhances the safety.

MR. DUNHAM: Okay. So, if it's absent what does it do to the level of safety?

THE WITNESS: It's an additional piece of information that's not there.

MR. DUNHAM: Okay. Could you please explain the obligations at the time of the accident of FAA facility managers regarding the maintenance and configuration of MSAW systems?

THE WITNESS: The -- the facility management -- you specifically require -- requesting regarding Guam or the system in general?

MR. DUNHAM: In general.

THE WITNESS: The facility management handbook provides some guidance for that. The 7210.3. And it's very broad. It read -- it allows facility management to inhibit systems. It requires oversight of the digital terrain maps of other mapping parts of that system. I'd have to refer to that particular

handbook to give you more specific.

MR. DUNHAM: Okay. That -- that's probably clear enough.

Was the ARTS IIA MSAW system at Guam CERAP operating in accordance with established standards and policies at the time of the accident?

THE WITNESS: Yes, it was.

MR. DUNHAM: Was MSAW providing any operationally meaningful services as configured at the time?

THE WITNESS: Not outside that one-mile ring, no.

MR. DUNHAM: Okay. Do you know what the terrain is under that one-mile ring?

THE WITNESS: I'm -- I'm not personally familiar with the 54-miles all the way around, but I don't think there was much terrain there.

MR. DUNHAM: Okay. Was there in fact any operationally significant distinction between the Guam MSAW performing as configured at the time of the accident and MSAW being completely shut off?

THE WITNESS: I'm -- any significant difference? Could you repeat that? Thank you.

MR. DUNHAM: That was -- that was essentially the point. Do you --

THE WITNESS: Okay.

MR. DUNHAM: --was there in fact any operationally significant distinction between the Guam MSAW performing as configured at the time of the accident and MSAW being completely shut off?

THE WITNESS: No, I would believe there isn't.

MR. DUNHAM: Okay. Do you use as part of your job full facility evaluation reports for exercising your ATC management responsibilities?

THE WITNESS: In my current position we do review reports that are sent to us.

MR. DUNHAM: Okay. And from time to time you might use those reports to identify problems in the system?

THE WITNESS: No. We -- we would not identify problems. The report would identify things that they have found, that the evaluations people have found. We would review that to see if there was impact on the procedures and day-to-day operation as we manage it.

MR. DUNHAM: Okay.

(Pause)

MR. DUNHAM: Okay. Could you look at Exhibit 3P, like puppet?

(Pause)

THE WITNESS: Yes.

MR. DUNHAM: Okay. This is the 1997 Guam CERAP full facility evaluation report. Based on the information contained in this report, what was the apparent status of the MSAW system at that time?

THE WITNESS: In the 1997 report?

MR. DUNHAM: Yes.

THE WITNESS: The 1997 report I believe did not mention the MSAW system.

MR. DUNHAM: And what does that tell you about it under normal circumstances?

THE WITNESS: There would be no problems identified.

MR. DUNHAM: Okay.

(Pause)

MR. DUNHAM: Mr. Howell has described the visual and oral alarms which are provided by ARTS and EARTS in response to conflict alert and MSAW activations and has noted that the EARTS oral alarm was disabled at the time of the accident. What effect would this have on the ability of CERAP controllers to detect an MSAW alarm activation?

THE WITNESS: On the EARTS system they would not receive the oral alarm but they would still be able

to see and -- and visually notice the visual attached alarm.

MR. DUNHAM: Okay. The Guam CERAP controllers on the midnight shift are using multiple radar scopes so their attention is sometimes distracted from one to the other. Would having an oral alarm contribute to bringing the alarm to their attention?

THE WITNESS: Conceivably.

MR. DUNHAM: Is disabling the oral alarm a common practice within the ATC facilities?

THE WITNESS: Within all ATC facilities?

MR. DUNHAM: Terminal and CERAPs.

THE WITNESS: That's outside my knowledge area. To my knowledge within the terminal ATC facilities it is not normal.

MR. DUNHAM: Okay. How about within the CERAPs?

THE WITNESS: CERAPs and en route, to my knowledge, it is normal.

MR. DUNHAM: Okay.

(Pause)

MR. DUNHAM: Would you look at Exhibit 3S, like Sam, 1, please?

THE WITNESS: Yes.

MR. DUNHAM: This is a Safety Board recommendation number 95-120 asking FAA to install oral MSAW warning equipment in VFR towers that receive radar information from a host radar control facility and would otherwise receive only a visual MSAW alert. The last response received from FAA seems to indicate that the recommendation has been accepted but only discusses ARTS III facilities. Is the oral alarm feature being extended to VFR towers currently covered by ARTS IIA systems?

THE WITNESS: Yes. The new automated system being delivered called Common ARTS contains that capability. It will have it for all of them. And that will be installed at all ARTS II -- current ARTS II facilities. I believe the projected date is April of 2000 to complete that waterfall.

MR. DUNHAM: Okay. When will -- in particular, when will Agana Tower receive an oral alarm capability?

THE WITNESS: I don't personally know the date of the waterfall for them. It will be sometime between now and April of 2000.

MR. DUNHAM: Okay. Could -- could you provide that for the record after your testimony?

THE WITNESS: Yes.

MR. DUNHAM: Okay. Is there any intention of providing the oral alarm capability through their currents ARTS IIA system prior to the installation of the IIE?

THE WITNESS: Technically, again, this is outside of my area of expertise. As I understand the way the system is built, the technical capabilities of the system, it cannot provide that oral alarm directly to two different airports as a primary, only to one primary. And Agana is the secondary airport in that system, so it cannot be adapted to do that. That's why Common ARTS is necessary to provide that to all of them in the ARTS II environment.

MR. DUNHAM: So, under the current capabilities of ARTS IIA as you understand it, the alarm will continue to be sent only to the CERAP?

THE WITNESS: As I understand it, yes.

MR. DUNHAM: At the time of the accident what was the staffing level of Guam CERAP?

THE WITNESS: The reports indicated two controllers on duty.

MR. DUNHAM: And is that normal and acceptable for midnight shift operations?

THE WITNESS: Yes.

(Pause)

MR. DUNHAM: Which facility was responsible for providing IFR services to the Korean aircraft at the time of the crash, the actual impact?

THE WITNESS: IFR services would be provided by the approach control or the CERAP facility.

MR. DUNHAM: Okay. So, as far as actual ATC responsibility for the aircraft, that remained with the CERAP?

THE WITNESS: For the IFR in-flight services, yes.

MR. DUNHAM: Okay. If CERAP is responsible for providing all the IFR services to Korean Air 801, why did it not initiate the search-and-rescue response when informed by Agana Tower that the aircraft couldn't be located?

THE WITNESS: I do not know that answer.

MR. DUNHAM: Okay.

(Pause)

MR. DUNHAM: Okay. No further questions.

(Pause)

CHAIRMAN FRANCIS: KCAB?

MR. LEE: Thank you, Chairman. Just one question. Did FAA head office evaluate Guam CERAP

personnel levels and working shift and MSAW training, training status, etc., after the Korean Airlines 801 accident? If there are some improvements to be made, could you please explain them briefly?

THE WITNESS: I'm sorry. I'm getting a lot of feedback. Could you repeat that?

MR. LEE: Okay. If there are some improvements to be made could you please explain them?

CHAIRMAN FRANCIS: He's -- he's asking the question in English.

MR. LEE: Did the FAA --

(Pause)

THE WITNESS: I'm getting feedback.

I -- I understand the --

CHAIRMAN FRANCIS: Why don't you just take --

THE WITNESS: -- there are improvements --

CHAIRMAN FRANCIS: -- take the headset off.

THE WITNESS: All right. That may help.

MR. LEE: One more? Okay. Did the FAA head office evaluate Guam CERAP's personnel levels, working shift, MSAW training status, etc. after the Korean Airlines 5801 accident? If there are some improvements to be made, could you please explain them?

THE WITNESS: I'm sorry. I still don't believe I understand the nature of your question. Is

it reference search-and-rescue efforts after the accident?

MR. LEE: Not -- no, not search-and-rescue. Just in CERAP's personnel levels and qualification and working shifts and training -- etc.

THE WITNESS: Okay. Staffing and training --

MR. LEE: Just the evaluate -- the evaluate to them -- just controller. Just evaluated on the investigation staff for the CERAP -- CERAP's office.

THE WITNESS: Okay. I'm -- my office does not oversee the training and personnel activities. I am not aware of any issues in that area.

MR. LEE: Okay.

Okay. That's it. Thank you.

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: No questions.

CHAIRMAN FRANCIS: Boeing Company?

MR. DARCY: No questions.

CHAIRMAN FRANCIS: Korean Air?

CAPT. KIM: No questions, sir.

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: No questions.

CHAIRMAN FRANCIS: NATCA?

MR. MOTE: No questions, Mr. Chairman. Thank you.

CHAIRMAN FRANCIS: We'll have to rely on Mr. Donner to ask a question.

MR. DONNER: Gee, I'm sorry, Mr. Chairman. I don't have any.

CHAIRMAN FRANCIS: Thank you.

Monty?

MR. M. MONTGOMERY: Thank you. No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Thank you very much.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: The next witness will be Mr. David Canoles, Manager, Evaluations and Investigations Staff, FAA.

Whereupon,

DAVID CANOLES

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

DAVID CANOLES

MANAGER

EVALUATIONS AND INVESTIGATIONS STAFF, AAT-20

FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C.

MR. SCHLEEDE: Mr. Canoles, please give us your full name and business address for the record?

THE WITNESS: My name is John David Canoles. My business address is Federal Aviation Administration, AAT-20; 800 Independence Avenue, Southwest; Washington, D.C., 20591.

MR. SCHLEEDE: And what is your current position at the FAA?

THE WITNESS: Current position is manager of the Air Traffic Evaluations and Investigations Staff, AAT-20.

MR. SCHLEEDE: Would you give us a brief summary of your training and education experience that qualifies you for your present position?

THE WITNESS: Yes, sir. I will.

I've been employed by the Federal Aviation Administration --

MR. SCHLEEDE: Slowly, please.

THE WITNESS: I've been employed by the Federal Aviation Administration in air traffic control for 27 years. I held journeyman air traffic control positions in three FAA terminals, held later post of training specialist, first-line supervisor, was manager of two air traffic facilities, including the tower in Newark, New Jersey.

In 1980 I became manager -- I'm sorry. In 1987 I became manager of the air traffic division for the eastern region therefore providing oversight over all facilities in that region. Subsequently was manager of the air traffic procedures division until two years ago when I accepted the position I have now.

MR. SCHLEEDE: Thank you very much. Mr. Dunham will begin the questioning slowly.

MR. DUNHAM: I'm really trying.

Mr. Canoles, good afternoon. What is the purpose of the FAA National Facility Evaluation Program?

THE WITNESS: Basically, the Evaluation Program measures the effectiveness and compliance of all field facilities with national standards, directives, and orders.

MR. DUNHAM: And how are evaluations conducted?

THE WITNESS: Evaluations are conducted on a regularly scheduled basis by teams of air traffic experts who are employed within my organization. These teams will range in size and duration of visit based on the size of the facility they are evaluating. They will travel on-site, collect data. They operate in accordance with a published checklist which can range

to several hundred items for -- for our more complex facilities, consist of evaluations and other measurements during their period of time in the facility, and the culmination of these visits is a written report which is given to facility management as well as management of the air traffic division having operational control over that facility.

MR. DUNHAM: How long does a typical evaluation take to complete of, say, a CERAP?

THE WITNESS: I'm guessing -- it's -- typically our evaluations range from three days to two weeks. I would say that an evaluation of a CERAP would probably involve four to five of my specialists for a duration of approximately one week.

MR. DUNHAM: And what is the composition of a typical facility evaluation team?

THE WITNESS: Again, the -- the range of numbers varies depending upon the size of the facility and the commensurate levels of work to be accomplished. Evaluators themselves are selected into this organization from among active air traffic control specialists. Typically, only those who have attained at least the rank of first-line supervisor. So in fact we're -- we're selecting individuals who have already distinguished themselves as -- as excellent controllers

in the first place. We try to maintain a mix of those who specialize in the en route terminal and flight service options.

MR. DUNHAM: Are the evaluators required to be experts in the area they are assigned to evaluate?

THE WITNESS: Not in all cases. For example, one of the areas that an evaluation would look at would be training. An air -- an air traffic controller proficient in training in a terminal facility could transfer those skills and knowledges and successfully evaluate an en route or a flight service facility. Therefore, we transfer that. Operational oversight is restricted to -- to people with experience in that particular option.

MR. DUNHAM: So, when the Guam CERAP automation functions were evaluated, would that have been done by an automation-trained specialist?

THE WITNESS: No. We did not evaluate the Guam CERAP automation functions nor do we evaluate the automation functions of any air traffic facility. Our evaluation focuses simply on operational effectiveness and compliance.

MR. DUNHAM: So, the automation section of the checklist that they use to do an evaluation actually accomplishes what?

THE WITNESS: No, the items contained in the evaluations portion of the checklist -- and incidentally, that has been modified just as a clerical point since -- since this accident -- are rudimentary at best. For example, in the area of MSAW at the time of this accident basically all we were doing was checking to make sure that the audible portion of the alarm was workable and had not been modified in the facilities. But as far as any in-depth evaluation of software, that is not accomplished by my teams.

MR. DUNHAM: You said that evaluations are conducted on a regularly scheduled basis. Do you believe that providing advance notice of an upcoming evaluation leads to a true picture of the facility's day-to-day quality of operation and compliance with directives?

THE WITNESS: I believe that it does by and large. And frankly, there's a trade-off involved. Surprise evaluations would probably give us more of a true picture, but our method of evaluation is one of teaching and coaching improvement in facilities rather than surprise inspections to -- to -- that could prove disruptive to the day-to-day operation. We do have latitude within our directive and I'm empowered by the director of air traffic to conduct surprise audits, if

you will, or surprise visits. We try to use them very, very sparingly, only in cases where we feel they're absolutely necessary.

MR. DUNHAM: And what would be one sort of typical situation that might provoke that?

THE WITNESS: The last one I recall was a non-Federal facility that we'd received complaints from the user community that they were providing services apparently using a radar that wasn't certified. We conducted a rather clandestine observation of that operation and indeed found that non-certificated equipment was in use and the controllers had not received training on it.

MR. DUNHAM: Have any no-notice evaluations been performed on an FAA facility?

THE WITNESS: Not in the past three or four years, no.

MR. DUNHAM: Could you please describe in general the functional areas examined in a typical evaluation?

THE WITNESS: Yes, there are four areas that are -- that are scrutinized. They are training, administration, quality assurance, and operations.

MR. DUNHAM: And then how are those -- the checklist items under those areas classified?

THE WITNESS: I'm sorry. I don't understand the question.

MR. DUNHAM: I'm looking for the -- the rating of each individual checklist item as commendable, etc.

THE WITNESS: Oh, I beg your pardon. The -- each item is -- is either rated as satisfactory, commendable if -- if a particular degree of excellence is witnessed in that particular checklist item, or as a problem, a problem being denoted only in instances where an FAA handbook or regulation is -- is violated or in cases where we feel that -- that an extreme safety factor is -- is at risk.

MR. DUNHAM: And is there a fourth classification?

THE WITNESS: I'm sorry?

MR. DUNHAM: Is there another classification besides those?

THE WITNESS: I believe we covered informational, satisfactory, commendable, and problem.

MR. DUNHAM: Okay.

(Pause)

MR. DUNHAM: So, what standard was the MSAW item on the CERAP checklist being compared to when the evaluation team was looking at it?

THE WITNESS: There were two evaluations. The two most current evaluations accomplished at Guam were in 1995 and '97. The 1995 evaluation contained an informational item that the Guam MSAW had been disabled to the 54-55 mile ring that we've seen earlier. And that was based on non-delivery of a digital terrain map. We were advised by the facility that that was anticipated to arrive some months late and would rectify the problem that they were encountering with MSAW.

MR. DUNHAM: Okay. And in 1997 was the MSAW referred to at all?

THE WITNESS: The -- in 1997 there was no reference to the MSAW. It was not brought to our attention in the facility as a difficulty. Therefore, we did not identify it.

MR. DUNHAM: And the 1995 evaluation, which was Exhibit P like Papa, pages seven through 17 -- excuse me, 16.

THE WITNESS: Say again the pages, please?

MR. DUNHAM: It's P seven through 16.

And in what -- what section is MSAW mentioned?

(Pause)

MR. DUNHAM: Page P14.

THE WITNESS: Thank you.

(Pause)

THE WITNESS: You're right. I didn't see it. It's at the bottom of the page. It -- the item does begin on page P14.

MR. DUNHAM: And what section of the report was that classified in?

(Pause)

THE WITNESS: It appears to be listed under the administrative segment of the report.

MR. DUNHAM: And then it was put in as an informational item?

THE WITNESS: Yes, it was.

MR. DUNHAM: And what -- what is the other item in that area that was classified as informational?

THE WITNESS: The other one has to do with FAA housing and difficulties regarding the FAA's ability to furnish Government-sponsored housing on Guam.

(Pause)

MR. DUNHAM: Can you describe the corrective actions and follow-up processes applied to informational items?

THE WITNESS: Informational items do not always require corrective action. By definition informational items are those that the evaluators feel need to be brought to the attention or could be of special interest to higher management.

MR. DUNHAM: So the inhibition of the MSAW functions at the Guam CERAP did not qualify as a problem under the FAA's evaluation standards?

THE WITNESS: No, sir. As stated earlier, there was no criteria by which it could be measured. Therefore, basically, it was in accordance with national standards.

MR. DUNHAM: Okay. Could you look at Exhibit 3J, page 16?

THE WITNESS: I'm sorry?

MR. DUNHAM: That's 3J, page 16.

THE WITNESS: Oh. Thank you. Yes, I have it.

MR. DUNHAM: Okay. Paragraph 13-2-7E. Could you read the guidance for the facility managers in section three of that paragraph, please?

THE WITNESS: Yes. 13-2-7B says the facility air traffic managers --

MR. DUNHAM: Sorry. It's E.

THE WITNESS: I'm sorry.

MR. DUNHAM: -- sorry.

(Pause)

THE WITNESS: That's the paragraph that begins "Facility air traffic managers shall ensure that"?

MR. DUNHAM: Yes. And then section three of that.

THE WITNESS: "Three, MSAW parameters are modified as appropriate to minimize the extent of inhibit areas as specified in the NAS configuration management documents, NAS MD 633, NAS MD 643 for MSAW and site adaptation."

MR. DUNHAM: Okay. Did the 54-mile radius inhibited area found at Guam in 1995 meet that standard?

THE WITNESS: It did not. However, it did meet other criteria contained in this same handbook which allows facility managers to otherwise modify MSAW temporarily if it's disruptive to the operation. We were advised that was the action that had taken place.

MR. DUNHAM: And is there any standard for how many years temporary could be?

THE WITNESS: No, I can't define that.

MR. DUNHAM: Could you please look at Exhibit P, Papa, one through six, which is the 1997 Guam evaluation report.

(Pause)

THE WITNESS: Okay.

MR. DUNHAM: In this 1997 report there is no mention of MSAW. As we've discussed that generally would indicate that it was satisfactory?

THE WITNESS: That's correct.

MR. DUNHAM: Was it in fact functional at that time?

THE WITNESS: Based on what I've seen, no, it was not. It was --

MR. DUNHAM: It --

THE WITNESS: -- it -- excuse me. I stand corrected and say that yes, it was functional but for all intents and purposes it was useless being only functional for a one-mile radius.

MR. DUNHAM: Would the evaluation team have been aware of that having reviewed the '95 report?

THE WITNESS: We would not have been unless we were alerted by facility personnel. Software in -- in the automation systems used by air traffic controllers, quality assurance is assured through configuration management, and I have no -- neither the

expertise nor the methodology to go in and check those systems.

MR. DUNHAM: Okay. In the '95 report the team was aware that the function was inhibited, correct?

THE WITNESS: Right.

MR. DUNHAM: The '97 team would have reviewed that report?

THE WITNESS: In all certainty, yes, they would have reviewed that report.

MR. DUNHAM: Would they have asked the simple question at that time of whether MSAW was functioning as intended?

THE WITNESS: I suspect that they either asked that question or they asked if the new digital terrain map had been installed, either one, which would have indicated to them that -- that this informational item no longer existed.

MR. DUNHAM: And so, the fact that the MSAW was not in fact working was of no particular concern to the evaluation?

THE WITNESS: No, sir, I would not say that. I would say that they were not made aware of it or they had reason to believe that that situation had been corrected.

MR. DUNHAM: So you're saying that it was noted as inhibited in the '95 report and the '97 team wouldn't be aware of it?

THE WITNESS: I'm sorry. Say that again?

MR. DUNHAM: You're saying that in the '95 evaluation where it was noted as inhibited the '97 team would not be aware that it had continued to be inhibited?

THE WITNESS: That is -- that's apparently what has happened, yes.

MR. DUNHAM: Okay.

(Pause)

MR. DUNHAM: In Exhibit R, take a look at that one, please. R like Robert.

(Pause)

MR. DUNHAM: Yeah, it's 3R.

THE WITNESS: Okay. Say again the number, please?

MR. DUNHAM: It's 3R like Robert. It's a safety recommendation.

(Pause)

THE WITNESS: R3?

MR. DUNHAM: Yeah, it's Exhibit R. It says 1994 -- I believe it's November 21st, 1994, is the date on that.

THE WITNESS: Okay. Yeah, '94, 186 through 188?

MR. DUNHAM: That's correct.

As Mr. Howell explained, that recommendation referred to some configuration problems with MSAW adaptations at Dulles Airport. It would -- would it be a function of the evaluation teams to go to a level where those problems would be detected or is that, as you said, only detectable through configuration management?

THE WITNESS: This sort of audit would be the initial responsibility of the office of primary interest, in this case either the air traffic requirements or the air traffic operations organizations. In cases where compliance is questioned my unit has been asked to go out specifically and -- and check various features. But routinely, no, we would not have been involved in this response.

MR. DUNHAM: Okay. Wouldn't that recommendation -- whereas accepted by FAA, they replied to the Safety Board that they would be conducting a review in order to check the parameters as specified in that recommendation. As we've seen, that recommendation was apparently attempted but the review process did not actually succeed in locating those

problems. Does the FAA have any evaluation process that would track responses to safety recommendations to ensure that they've been completed properly?

THE WITNESS: Yes, and -- and in my organization these are referred to as special emphasis items. For example, subsequent to the -- to the Guam accident Air Traffic Operations and AOS jointly asked us to go out and as a special emphasis item interview automation specialists in facilities to ascertain their level of compliance with national directives. This is something that will run for a year or two years based upon their request and then will expire.

MR. DUNHAM: Okay. That -- we'll talk about that more in a minute.

Do you know if, in reference to the 1994 review, was there any sort of follow-up evaluation performed?

THE WITNESS: I don't know.

MR. DUNHAM: Does the Air Traffic Service have any quality assurance program in place other than facility evaluations that should have detected these chronic MSAW problems?

THE WITNESS: There are basically three evaluations-type processes in effect in Air Traffic Service. One is the one that I manage, which looks at

air traffic operational issues. Airways Facilities has a similar effort underway for compliance to national standards for hardware and so on and so forth. And then AOS maintains a separate quality assurance role in assuring the quality of the -- of the software that they develop.

MR. DUNHAM: But at the time of the Guam accident that software was actually the responsibility of Air Traffic Service as far as its functionality, correct?

THE WITNESS: I -- I believe it was in transit, so I would hesitate to say precisely whose responsibility it was on that given day.

MR. DUNHAM: Was your office responsible for that item before the transition?

THE WITNESS: For what item?

MR. DUNHAM: The MSAW quality.

THE WITNESS: No. As -- as far as the software?

MR. DUNHAM: Well, if it belonged -- I'm trying to establish that you're saying that we're not sure whether it belonged to Air Traffic or Airway Facilities.

THE WITNESS: No, the organization I head has never had responsibility for -- for auditing MSAW or

any other operational software. We -- we will, if made known by the -- by the people who use it, certainly identify it to the organization that has primary interest over it. But again, quality assurance is assured mainly through -- through configuration management.

MR. DUNHAM: Okay. So on the -- at the time of the Guam accident, who was the office of primary responsibility for MSAW configuration?

THE WITNESS: It was somewhere between the ATO, the ATR, and the AOS organization. And I -- I can't tell you with precision.

MR. DUNHAM: All right. So do you know -- are you aware of who would have been responsibility -- or who would have been responsible for oversight of the work of local automation specialists?

THE WITNESS: Again, because the transition between Air Traffic and AOS was taking place I'd be guessing.

MR. DUNHAM: Well, the automation specialists are and remain Air Traffic employees, correct?

THE WITNESS: They are, yes.

MR. DUNHAM: Okay. So wouldn't that put the responsibility for their work with Air Traffic?

THE WITNESS: It --it should but again, because of the transition I'm not sure. There were various responsibilities being transitioned over from AT to AOS. I was not intimately familiar with -- with that transition or how it was taking place so I can't speak to it with any authority.

MR. DUNHAM: All right. I think we'll skip that one.

The evaluational order that the teams use when they go to the field provides standards references for various checklist items. How are those standards selected?

THE WITNESS: They're designed first and foremost based on requirements contained in the controller's handbook 7110.65. Also, facility operations and administration and other air traffic documents. The checklist is -- is updated frequently because of the number of manuals that references, they change on different cycles. Therefore, maintaining the references for each and every item is -- is somewhat of a difficult chore.

We also accept input from both air traffic users and air traffic providers and the services who -- who direct and develop air traffic policy for special emphasis items and areas of current concern that we

look at.

MR. DUNHAM: So, is the objective in selecting the standards to ensure that that checklist item is functionally acceptable or simply meets some administrative standards or operationally useful standards?

THE WITNESS: Could you repeat that, please?

MR. DUNHAM: Let me rephrase it. The -- the standard, for example, on the checklist for MSAW as you've stated refers to the facility operation and administration guide, and the guidance in that manual is very general. For some example, the EARTS III systems, there are specific configuration management documents which ensure the performance of MSAW is according to standard. Those references are not part of the standards that are used on the checklist.

THE WITNESS: I still didn't understand the last sentence you said.

MR. DUNHAM: The -- the standard on the checklist item for compliance --

THE WITNESS: Mm-hmm.

MR. DUNHAM: -- is not the technical reference for MSAW. It's instead a general management reference --

THE WITNESS: Right.

MR. DUNHAM: -- which doesn't necessarily ensure that the configuration meets performance standards for MSAW. Is that normal?

THE WITNESS: Yeah. Again -- again, considering that -- that this evaluation is aimed only at -- at operational compliance with national standards, the technical standards under which MSAW is written and governed would -- would be a matter for those developing the software to monitor. Again, I don't have the expertise with me along on evaluation trips to go into that level of detail in the automation software programs.

MR. DUNHAM: Okay. Does your office have any responsibility for developing the FAA response to the 1994 safety recommendation we spoke of a minute ago?

THE WITNESS: My office today did not exist in 1994 when that response was crafted.

MR. DUNHAM: Mm-hmm.

THE WITNESS: I was affiliated with -- with the -- as a matter of fact, I was the director of the prior organization, the Office of Air Traffic System Effectiveness. We would have been involved in fielding the question. However, the actual response would have been written probably by the Air Traffic Requirements

Organization at that time.

MR. DUNHAM: Okay. Have you made any changes to the evaluation process in response to the Korean Air accident or any issues arising from it?

THE WITNESS: Yes, we have. As Mr. Howell described to you, our plans for -- for future configuration management of software built for MSAW as an interim measure, we've -- my office has sat down jointly with Air Traffic Operations. We've come up with a list of -- of questions which we now pose to automation specialists within a facility to try to measure compliance. I'll be candid and tell you it's -- it's not a perfect system and that's why we're working towards one of -- of tighter configuration management because it's going to be the only -- the only solid cure to what we're trying to achieve.

MR. DUNHAM: All right. No further questions.

CHAIRMAN FRANCIS: KCAB?

MR. LEE: Thank you, Chairman. Chairman, I have no questions. Thank you.

CHAIRMAN FRANCIS: Thank you.

Boeing Company?

MR. DARCY: We have no questions, Mr. Chairman.

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: No questions.

CHAIRMAN FRANCIS: Korean Air?

CAPT. KIM: I have one question. My official assistant ask you.

FIRST OFFICER CHUNG: Our question involves -- and thank you, Mr. Canoles. If the Guam Tower controller theoretically had used the D-BRITE facility in your judgment -- I'm not sure if we're asking the right person -- but would this have been a breach of FAA regulations since it was not commissioned? And if that's not a fair question, you don't have to answer it.

THE WITNESS: I -- I would respond and say that -- that we do not allow the use of non-certified air traffic equipment as -- as we wouldn't allow someone to fly a non-certified aircraft. Until it was certified to meet certain stringent safety and accuracy requirements we would -- we would not allow it nor we would encourage it or allow it.

FIRST OFFICER CHUNG: So in essence you would not allow -- they would not be authorized to use D-BRITE equipment as it was?

THE WITNESS: That's correct. They would be told not to use it.

FIRST OFFICER CHUNG: Thank you.

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: Thank you. No questions.

CHAIRMAN FRANCIS: NATCA?

MR. MOTE: Thank you, Mr. Chairman. No questions.

CHAIRMAN FRANCIS: FAA?

MR. DONNER: Thank you, sir. No questions.

CHAIRMAN FRANCIS: Mr. Feith?

MR. FEITH: No questions.

CHAIRMAN FRANCIS: I just -- I guess I'd ask one question, and it refers back to some of the things that Scott was talking about. This is the issue of -- of where an evaluation office, quality assurance office reports within an organization. Has the FAA ever considered that your office reporting somewhere other than to -- to the AT 1 or who -- to whom do you report, I guess is --

THE WITNESS: Mr. -- Mr. Chairman, I do report to AT 1. Air Traffic --

CHAIRMAN FRANCIS: I'm not trying to -- to take a piece out of my friend Mr. Morgan's hide here. I --

THE WITNESS: Thank you.

CHAIRMAN FRANCIS: -- I think it's an important question.

THE WITNESS: Thank you, sir, and I'll tell him you said that.

We have -- we have never moved to do it. We -- we once had a direction from the secretary of Transportation which caused us to take it out of Air Traffic. The head of Air Traffic at that time, Bill Pollard, was successful and prevailed with the next secretary to bring it back. We realized that there is -- there is the potential for being too close to topics being employed in the same organization. However, we feel that that is more than adequately balanced by the fact that we can maintain a work force of fresh, current people who are -- are capable of evaluating today's current issues in air traffic.

CHAIRMAN FRANCIS: I guess I'd say that, you know, we -- we spend a lot of time in this industry -- again, and this is not just with the FAA, but we talk a lot, to -- to airlines particularly, about the importance of their safety departments not reporting through operations because there is a potential conflict but rather reporting directly to the CEO of the organization, so I -- I would like to -- to I guess suggest to the FAA that they might want to at least

take a look at this. I'm not sure that Jane Garvey needs any more people reporting to it either, but -- but it's a -- it's an extraordinarily important question and I think that the questioning here indicates that we do have some concerns in this area.

THE WITNESS: Again, sir, I think Mr. Morgan has moved to that. He -- he has established me as an officer reporting directly to him. Prior to that we were a service in competition for resources with other air traffic services. So, as -- as a peer to the directors who set policy in air traffic, I certainly have a free voice and can get to him with -- with any degree of urgency I demand to -- to bring issues to his -- to his office.

CHAIRMAN FRANCIS: Thanks very much for your testimony.

THE WITNESS: Yes, sir.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: Now we will -- I'm sure that there's nobody here that's at all interested in taking a break, but I'm going to dictate it anyway. We'll take a break. It's -- until 4:00.

(Whereupon, a brief recess was taken.)

CHAIRMAN FRANCIS: All right. Our -- our next witness is Mr. Carl Schellenberg, the director of

Potomac Tracon Development, FAA in Washington.

Whereupon,

CARL SCHELLENBERG

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

CARL SCHELLENBERG

DIRECTOR

POTOMAC TRACON DEVELOPMENT, ATS-20

FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C.

MR. SCHLEEDE: Mr. Schellenberg, please give us your full name and business address for the record?

THE WITNESS: My full name is Carl B. Schellenberg. My business address is FAA Headquarters, 800 Independence Avenue, Washington, D.C.

MR. SCHLEEDE: And what is your present position with the FAA?

THE WITNESS: I'm sorry. I couldn't hear you.

MR. SCHLEEDE: What is your present position with the FAA?

THE WITNESS: My present position is director of the Potomac Program.

MR. SCHLEEDE: Would you give us a brief description of your education, training, and experience that brings you to your present position?

THE WITNESS: Yes. I have a Bachelor of Arts degree, Juris Doctor degree, and Master of Management degree. I've been employed by the Federal Aviation Administration for 29 years. I have served in capacities within the legal organization as regional counsel, chief of regulations and enforcement. I have served as deputy regional administrators in two regions. I was regional administrator in FAA's Western Pacific region. I have been director of System Capacity and Requirements. And in the immediate time of this accident and the aftermath I was acting as deputy associate administrator for Air Traffic Services.

CHAIRMAN FRANCIS: We -- we appreciate your only mentioning half of the positions that you've held in the FAA.

THE WITNESS: Thank you, Mr. Francis.

MR. SCHLEEDE: Thank you. Mr. Dunham will continue the questioning.

MR. DUNHAM: So, at the time of the accident you were deputy director for Air Traffic?

THE WITNESS: Deputy associate administrator for Air Traffic Services.

MR. DUNHAM: All right. Deputy associate administrator, okay.

To -- to start off kind of a follow-up from the -- the previous witness. Can you tell me who the automation specialists work for?

THE WITNESS: At what time?

MR. DUNHAM: At the time of the Korean Air accident.

THE WITNESS: At the time of the Korean Air accident the automation specialists were part of the Air Traffic Organization.

MR. DUNHAM: And who was responsible for overseeing their work?

THE WITNESS: Under those circumstances the Air Traffic Organization, the director of Air Traffic was responsible for that and the associate administrator for Air Traffic Services -- was responsible for direction above that.

MR. DUNHAM: So, at a -- let's go to a lower level. Were they reporting to the facility manager? You know, I'm trying to figure out who -- who would have been responsible for their quality assurance of their work.

THE WITNESS: Well, you -- let's talk two things. You talked about the reporting relationship of the automation specialists. That was a reporting relationship to the air traffic facility manager within that facility.

At the time ofthis accident, however, there was because of the policy that existed at that time some lack of clarity in who had the overall quality assurance requirements for assuring that the integrity of programs such as MSAW.

MR. DUNHAM: So, does that mean they weren't working for anyone who was actually responsible for the quality of their work?

THE WITNESS: That means that -- that there was no single entity at that point clearly responsible for the quality of programs and the total service delivery of -- of the MSAW program. That has since been changed.

MR. DUNHAM: Okay. Thank you.

To your knowledge, were there any concerns within FAA about MSAW performance before the Korean Air accident?

THE WITNESS: While there were, of course, continuing concerns about the program, major concerns about MSAW started with the investigation following

this accident.

MR. DUNHAM: How about before the accident?

THE WITNESS: Well, as I said, there were continuing concerns. There were items that you've mentioned previously in testimony with regard to the recommendations of the Board, and we were, of course, concerned with the program at that point. That concern escalated dramatically following this instance.

MR. DUNHAM: Okay. What -- what remedial efforts were in progress before the accident, if any?

THE WITNESS: Well, the efforts that we had talked about, some of the things that you have mentioned on some of the safety recommendations, those kinds of efforts were the continuing remedial efforts with regard to MSAW.

MR. DUNHAM: Okay. So, after the -- the 1994 review, for example, was there any management oversight to see if that review had been effective?

THE WITNESS: Was there any management oversight? Yes, there was.

MR. DUNHAM: And what was the assessment of the management as far as the quality of that review?

THE WITNESS: Well, I -- you -- I have to -- I have to answer as of a point in time. If you ask me was there management oversight, yes, I will tell you.

If you ask me as of today am I satisfied with the extent of the management oversight that was exercised at that time, I am not. That's why we have changed it and -- and improved it.

MR. DUNHAM: All right. And what will FAA be doing to ensure that MSAW performance does not deteriorate?

THE WITNESS: Well, there are variety of things that we have done. First of all, we've established clear responsibility in a single organization for all of the aspects relating to MSAW, its performance, and its continued performance. That organization has established a number of very important pieces -- Mr. Howell testified to them earlier -- such as the establishment of a -- of criteria and standards against which MSAW performance will continue to be gauged and implemented. He's mentioned to you standards by which he will go back and do periodic updates against those standards to ensure that that performance continues. He's developed a variety of automated techniques and tools to quickly, promptly, and accurately determine the performance of all the M-site -- MSAW facilities.

In addition, we've developed flight inspection protocols and criteria to supplement that

effort so that with the clear-cut responsibility, the tools, and the standards we feel we have at this point a far better policy, guidance, and direction of the MSAW system.

MR. DUNHAM: Okay. So, does FAA plan to continue to provide AOS with the level of support required to maintain the quality of that program?

THE WITNESS: Yes.

MR. DUNHAM: Okay. After this reorganization, do you still plan to continue to have automation specialists in the field facilities?

THE WITNESS: There will be a -- a change in the role of the specialists in the facilities to a multi-function approach and -- and responsibility. We have transitioned and increased the level of support in the AOS organization for accomplishing what previously was work done by the automation specialists. So there will be some decrease in the -- of the level and numbers of people within the air traffic organization. That now will be covered and accomplished by the AOS organization to replace that and improve that effort.

MR. DUNHAM: So there will still be people in the field with responsibility for some automation issues?

THE WITNESS: That is correct.

MR. DUNHAM: Will those people have access to sufficient training to ensure they're competent at that?

THE WITNESS: Yes.

(Pause)

MR. DUNHAM: And a more general question. In response to the earlier recommendation we discussed that provoked the 1994 review, the Safety Board received a letter from the FAA in response to that saying that this review had been completed. As that's been testified to today it was something less than effective. What policy changes do you anticipate to ensure that the Board can have confidence in responses from the FAA to a safety recommendation?

THE WITNESS: Let me answer that this way, Mr. Dunham. What we did following the '94 request I think was a good faith attempt to try to get a -- an accurate and complete response back to the Board. What we have learned since then and as a product of -- of our efforts following this particular accident that in the case of -- of issues involving complex systems such as MSAW and its adaptation to simply pull each of the offices and ask them if in fact they meet all the established criteria is not a satisfactory means to

really test whether that system is doing what it needs to do. That's why we have made the change, particularly the ones Mr. Howell testified to, so that in the future where we have to -- to respond and -- and describe the -- the state of the system in such complex systems we will use a similar process to that which we have described here where necessary.

There are some circumstances with less complex issues where such a polling can get a rapid, quick response of the status of individual items. In those cases we will continue to use that kind of process. What we will do is -- is exercise better judgment as to which of the tools works well under the particular circumstance we're trying to respond to. We learned a lot as a result of this.

MR. DUNHAM: And the FAA runs a -- a fairly, you know, decentralized organization. There are lots of facilities out there responsible for different functions. Even after receiving such a response from a facility will there be any formal follow-up efforts as part of the facility evaluation process or some other evaluation process to verify that that item has in fact been complied with?

THE WITNESS: Yes. We will use a combination of -- of the means that are most effective. In this

particular case we're talking about MSAW. The -- the -- the use of -- of an evaluation program is probably not the most effective means to ensure the continued integrity of that system. The responsibility assigned to a specific focal point as we have, the techniques and tools Mr. Howell testified is a superior way, really, to keep the status of that system up-to-date and current and -- and known rather than using an evaluation process.

There are -- there are pieces of the evaluation process that will work well with that new system. What we will do is try to have the optimum mix of those two to stay on top of the issues. So there will be some pieces on an emphasis basis that Mr. Canoles and -- and his organization will continue to do, but the real driver in keeping track of the performance of MSAW will lie with the AOS organization.

MR. DUNHAM: All right. Can you describe FAA's future plans for management of air traffic-related software?

THE WITNESS: Our future plans for the management of air traffic-related software?

MR. DUNHAM: Yes.

THE WITNESS: As I indicated to you before, we are -- we have transitioned and moved most of that

responsibility for air traffic-related software into the AOS organization to administer and maintain it with some support left within the Air Traffic Organization to provide the necessary field connectivity to make that happen. That's the general structure of the way we're going to proceed for the other systems, if I understood your question.

MR. DUNHAM: All right. I'm looking at the -- the more general issue of not just MSAW but are you -- your intention is to effectively place AOS in charge of all air traffic-related software management?

THE WITNESS: That is the -- that is the transitional step that we are referring to, yes.

MR. DUNHAM: Okay. And that'll continue with the STARS program and anything else that comes in later on?

THE WITNESS: It will occur in -- in the optimum blend with all those programs, yes.

MR. DUNHAM: Okay. No further questions.

THE WITNESS: Thank you.

CHAIRMAN FRANCIS: KCAB?

MR. LEE: Thank you, Chairman. No questions. Thank you.

CHAIRMAN FRANCIS: NATCA?

MR. MOTE: Thank you, Mr. Chairman. No questions.

CHAIRMAN FRANCIS: Government of Guam?

MR. DERVISH: Thank you. No questions.

CHAIRMAN FRANCIS: Korean Air?

CAPT. KIM: No, thank you, sir.

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Boeing Company?

MR. DARCY: We have no questions, Mr. Chairman.

CHAIRMAN FRANCIS: Mr. Feith?

MR. FEITH: No.

CHAIRMAN FRANCIS: Carl, we shouldn't let you off this easily.

THE WITNESS: Why not?

(Laughter)

CHAIRMAN FRANCIS: Oh, sorry. Mr. Donner. You've been so -- you've been so non-responsive all day long I forgot all about you.

MR. DONNER: Thank you for finally recognizing the FAA, sir. We have no questions either.

(Laughter)

CHAIRMAN FRANCIS: Why does that not surprise me?

I guess I'd just say Carl, and we talked a little bit about this at the break, the question of the evaluation and quality assurance function that I mentioned to Mr. Canoles. I think that this is something that's interested and interesting, important, and I hope you folks will be looking at.

THE WITNESS: Yes, Mr. Francis. We continue to -- to examine that. As -- as you and I chatted, the reporting relationship has been in a variety of places when -- within the FAA. That location of the reporting relationship does not necessarily ensure success of the program. It's terribly critical we have the right people administering the program regardless of where the reporting relationship, and that's the really most important base.

CHAIRMAN FRANCIS: Thanks very much.

THE WITNESS: Thank you.

(Whereupon, the witness was excused.)

CHAIRMAN FRANCIS: Next witness will be Lewis Zeigler, who is the principal operations inspector for KAL, the Flight Standards District Office in San Francisco. Mr. Zeigler will be the last witness today.

Whereupon,

LEWIS ZEIGLER

was called as a witness, and first having been duly sworn, was examined and testified as follows:

TESTIMONY OF

LEWIS ZEIGLER

KOREAN AIR GEOGRAPHIC OPERATIONS INSPECTOR

FAA FLIGHT STANDARDS DISTRICT OFFICE

SAN FRANCISCO, CALIFORNIA

MR. SCHLEEDE: Mr. Zeigler, please give us your full name and business address for the record?

THE WITNESS: Lewis I. Zeigler. The business address is 831 Nitten Road, Burlingame, California, 94010.

MR. SCHLEEDE: And you work for the FAA?

THE WITNESS: Yes, sir. I do.

MR. SCHLEEDE: In what position?

THE WITNESS: I'm a international geographic inspector at the San Francisco International Field Office.

MR. SCHLEEDE: Could you give us a brief description of your training, education, and experience

that brings you to that present position?

THE WITNESS: I have a bachelor of arts degree. I'm a retired Marine Corps aviator. I flew commercially for 10 years. I've been with the FAA for a little more than 12 years. And I've been an international geographic inspector for the last 10 years and five months.

MR. SCHLEEDE: Thank you. Captain Misencik?

CAPTAIN MISENCIK: Hello, Mr. Zeigler.

Prior to working in the western area you were a geographic inspector in Europe, I believe, weren't you?

THE WITNESS: Yes, sir. I was.

CAPTAIN MISENCIK: How long were you over there?

THE WITNESS: Seven years.

CAPTAIN MISENCIK: And how long have you been now in -- working out of California?

THE WITNESS: Since the first of October of 1994.

CAPTAIN MISENCIK: Okay. At the time of the accident last July what international carriers were you responsible for for providing oversight?

THE WITNESS: I had Air Nehru, Korean Airlines, Asiana Airlines, Garuda, Malaysia, Japan Air

Charter, and Japan Air System.

CAPTAIN MISENCIK: Are you still providing oversight for Korean Airlines?

THE WITNESS: No, sir. I am not.

CAPTAIN MISENCIK: What airlines do you oversee at this time?

THE WITNESS: I have Air China, China Eastern, China Southern, All Nipon, Nipon Cargo, and I have the geographic responsibility for one of the Mexican airlines who we don't hold the op specs for 'em, Allegro.

CAPTAIN MISENCIK: When did you cease providing oversight for Korean Air?

THE WITNESS: In October '97.

CAPTAIN MISENCIK: Was that a scheduled transition or --

THE WITNESS: No, sir. We -- usually once a year or every two years we kind of rotate the airlines around to the different inspectors, but in this case we had an inspector that retired so we had to redivide all the airlines up. And then after that we had another new inspector came in the office some years later, so we ended up having to divvy 'em up again.

CAPTAIN MISENCIK: Concerning Part 129 oversight, how is Part 129 authority granted to foreign

airlines?

THE WITNESS: It's through the IKO and the FAA grants the -- well, IKO grants the U.S. Government the authority to inspect foreign airlines.

CAPTAIN MISENCIK: But who grants the -- the certificate? Is that the -- the FAA?

THE WITNESS: The FAA.

CAPTAIN MISENCIK: I understand. Does any other agency have any authority in granting Part 129 authority?

THE WITNESS: Only the Economic Authority, which is invested with the Department of Transportation.

CAPTAIN MISENCIK: How is being responsible for Part 129 oversight similar and different from Part 129 oversight?

THE WITNESS: You mean Part 121?

CAPTAIN MISENCIK: I'm sorry. How does Part 120 -- how is it different from Part 121, being a Part 121 --

THE WITNESS: Well, there are some similarities in that we do some of the same types of inspections, such as ramp inspections, station facility inspections, trip records inspections. We issue op specs. But in the case with the 121 carrier, you have

the responsibility of approving all their training programs, all their manuals, lots of things that we do not have the authority to do under 129.

CAPTAIN MISENCIK: Who approves the -- who handles the oversight that normally would be provided for under Part 121 that -- that you don't do under Part 129?

THE WITNESS: The foreign government civil aviation authorities of whatever country we're talking of.

CAPTAIN MISENCIK: Just backtracking a little, when you were providing oversight at the time of the accident for Korean Air and all of the other carriers, how many airplanes normally were -- would you estimate that that included at that time?

THE WITNESS: You mean how many aircraft? That's -- my airlines have?

CAPTAIN MISENCIK: Yes.

THE WITNESS: I have no idea.It's quite a few.

CAPTAIN MISENCIK: Okay. Do you have any oversight responsibility regarding ground and flight training at all with foreign carriers?

THE WITNESS: No, sir. We do not.

CAPTAIN MISENCIK: Do you have any basic fundamental knowledge or any requirement to have basic or fundamental knowledge of the general operations manual or any of the -- the flight operations procedures for the foreign carriers?

THE WITNESS: No, sir. We don't.

CAPTAIN MISENCIK: Do you do en route inspections on the foreign carriers you oversee?

THE WITNESS: No, sir. We do not.

(Pause)

CAPTAIN MISENCIK: The -- the responsibility that you have under Part 129 or -- or actually, the -- the responsibilities that you share with the foreign governments, what -- what defines those responsibilities? Is there a document or the sharing of responsibilities, the --

THE WITNESS: I --

CAPTAIN MISENCIK: -- 129.

THE WITNESS: The IKO articles and the annexes grant us the authority to inspect aircraft within the United States, and our FAA handbooks and other orders tell us how we do our job.

CAPTAIN MISENCIK: What incentive is there for Part 129 air carriers to comply with Federal Aviation regulations?

THE WITNESS: I'm sorry, sir. Would you --

CAPTAIN MISENCIK: I said what incentive is there for foreign airlines to comply with our regulations? What --

THE WITNESS: Well, they -- the incentive is if they want to operate in the United States then they must comply with the IKO rules and Air FAR 129.

CAPTAIN MISENCIK: Okay. What procedure -- by which procedure are concerns, letters of investigation, or violations handled concerning foreign carriers that are operating under Part 129?

THE WITNESS: You mean how we go about doing a violation?

CAPTAIN MISENCIK: Yes.

THE WITNESS: Well, if we were to uncover something wrong we would initiate a violation or enforcement package. It would then go to the regional counsel's office, and it's handled by the regional counsel. They then forward it to Washington. I think from Washington it goes to the State Department and thence to the foreign government.

CAPTAIN MISENCIK: How does the -- how is the airline itself notified of this letter of investigation or -- or violation?

THE WITNESS: Well, at the time we initiate the investigation we do send a letter of investigation to the airline or to the individual pilot if it was a -- a violation against the pilot himself. And generally speaking, we would also send a copy of that to the foreign civil aviation authorities so that they would at least be informed that it was -- what was going on.

CAPTAIN MISENCIK: In your experience, how have the foreign carriers that you oversee responded to LOIs or enforcement actions or other discrepancies that you have brought to their attention?

THE WITNESS: Well, if you're asking do they ever respond, yes, they do. I've always gotten an answer back from the airline.

CAPTAIN MISENCIK: Well, have they responded in a manner consistent with, say, the way U.S. carriers would respond to LOIs or other enforcement action?

THE WITNESS: Yes, sir.

CAPTAIN MISENCIK: Do you do ramp checks also on foreign carriers?

THE WITNESS: Yes, sir. We do.

CAPTAIN MISENCIK: Have you ever been refused admittance to an aircraft or -- or a facility by foreign -- a foreign airline?

THE WITNESS: No, sir. I have not.

CAPTAIN MISENCIK: If you would be refused admittance to an aircraft, how would that be -- what would be your marching orders?

THE WITNESS: Well, I -- first thing I would do, inform the captain, remind him of the fact that IKO regulations give us the authority to inspect his aircraft and his crew and recommend that he maybe change his mind about allowing me to inspect him. Should he not do so, I would inform him that the first action I would take would be to inform the civil aviation authorities of his government that I'm being denied access. I would also open an investigation for filing a violation against him. And hopefully they would change their minds. If they didn't, then that's what I would do.

CAPTAIN MISENCIK: Do you normally -- or how do you interact with the KCAB in oversight of Korean Airlines or when you were overseeing Korean Airlines? Was there a -- a flow of information between the two government agencies?

THE WITNESS: Not generally speaking, but on a couple occasions where we discovered a problem are there I did send a -- a letter to the KCAB to inform 'em of what we had found.

CAPTAIN MISENCIK: Uh huh. Do you receive reports of KCAB concerns or -- with -- or did you receive reports of KCAB concerns with Korean Airlines?

THE WITNESS: No, sir.

CAPTAIN MISENCIK: Do you receive -- or were you furnished copies of Korean Air manuals, operational procedures, or -- or any other materials from the airline?

THE WITNESS: No, sir. We do not.

CAPTAIN MISENCIK: Are they required or why didn't you receive them --

THE WITNESS: No, sir. They -- we're -- we're -- they're not required to submit copies of their manuals to us. The only exception to that would be if the airline was operating a U.S.-registered aircraft. Then the FAA has to improve the maintenance program and the MEL for that aircraft.

CAPTAIN MISENCIK: The -- is it required or -- that you send reports of your inspection activities concerning Korean Air to the KCAB?

THE WITNESS: No, sir. There is no requirement.

CAPTAIN MISENCIK: So essentially, there is no requirement for an exchange of information between the -- the two overseeing agencies?

THE WITNESS: No, sir.

(Pause)

CAPTAIN MISENCIK: With the airlines that you were overseeing at the time that you were providing oversight to Korean Air, how did Korean Air compare with the other airlines you were overseeing as far as discrepancies, concerns, LOIs?

THE WITNESS: Average.

CAPTAIN MISENCIK: Uh huh.

THE WITNESS: No better, no worse, you know.

CAPTAIN MISENCIK: There -- the discrepancies that manifested themselves at Korean Air, did they differ either in quantity or nature from any of the other airlines?

THE WITNESS: No, sir.

CAPTAIN MISENCIK: During the time period you were overseeing Korean Air, how many letters of investigation, violations, or enforcement actions did you initiate against them?

THE WITNESS: I initiated one violation, a second one was to one of their pilots, and that one was settled with a warning letter.

CAPTAIN MISENCIK: Okay. You -- and one was settled and one wasn't?

THE WITNESS: Well, one is still open, sir.

CAPTAIN MISENCIK: I understand. Has Korean Air ever failed to respond to a letter of investigation initiated by your office?

THE WITNESS: No, sir. Not to my knowledge.

CAPTAIN MISENCIK: Does the State Department or any other government agency other than the FAA have any jurisdiction in enforcement actions against foreign carriers?

THE WITNESS: No, sir.

CAPTAIN MISENCIK: Has any government agency suggested leniency or that you take it easy in providing oversight to any of the foreign carriers?

THE WITNESS: To me, sir?

CAPTAIN MISENCIK: Yes.

THE WITNESS: No, sir.

CAPTAIN MISENCIK: Are you aware of -- of that situation happening to any other POI?

THE WITNESS: No, sir. I'm not aware of any such thing.

CAPTAIN MISENCIK: Uh huh. Well, I was just curious about your comment to me that indicated maybe there was something else, but --

THE WITNESS: Well, I'm -- I'm sure there's political pressure being applied to the top echelons of

the FAA, but what goes on up there I'm not aware of. But personally, nobody's tried to put any pressure on me.

CAPTAIN MISENCIK: Uh huh. How are you sure of that, Mr. Zeigler?

THE WITNESS: Well, I'm -- I'm assuming just a fact of life, politics being politics.

CAPTAIN MISENCIK: I understand. What were some of the examples of your findings with Korean Air in ramp inspections or other -- other oversight -- some of the discrepancies that you had uncovered?

THE WITNESS: Well, one of the problems that we find probably with every one of the foreign carriers is with the floor path escape lighting system. On arrival we'll usually find the whole series, maybe a whole section of the cabin where the lights are inoperative. And in generally speaking, they fix 'em before they leave because the MEL says that they cannot have more than two in a row out at any one time. That's one of the more common things that we find.

The other thing is occasionally we'll find pilots that either don't have their license or they don't have their medical certificates with them. Those are probably the three most common things that we find.

CAPTAIN MISENCIK: Is that pretty common among the -- the carriers you -- you oversee or was that --

THE WITNESS: Everybody.

CAPTAIN MISENCIK: So, was there anything that stood out in your mind about Korean Air as far as oversight -- your oversight of the airline compared to the other carriers you oversaw?

THE WITNESS: No, not that I can think of offhand.

CAPTAIN MISENCIK: As a result of the accident in -- in Guam, are you aware of any changes that have occurred in -- in their operations, Korean Air operations?

THE WITNESS: I'm not aware of any.

CAPTAIN MISENCIK: Are you aware of any changes or proposed changes that have occurred at the FAA as a result of -- in Part 129 operations a result of the Guam accident?

THE WITNESS: I'm not aware of any, sir.

CAPTAIN MISENCIK: Okay. As a -- an international geographic or -- I know it's not a correct term, but POI, what changes would you like to see that would make your job of oversight more efficient or --

THE WITNESS: Wel, I would like --

CAPTAIN MISENCIK: -- more safety-directed?

THE WITNESS: I would like to see FAR 129 rewritten in a more thorough and complete manner at least similar to the way 121 is written.

I would like to see the new automated 129 op specs produced so we can start using 'em.

And I would like to see more thorough guidance in our handbooks and our orders for geographic international inspectors.

And one other thing that I would like to see corrected would be the addition of in -- in FAR 91 the addition of all of the articles of IKO and the annexes rather than the one place that it quotes in 91703 A2 where it only refers to Annex 2. The other annexes, particularly Annex 6, are far more important. That's the heart of the operating parts of the annexes. And there are certain of the articles that are also extremely important.

CAPTAIN MISENCIK: Okay. Thank you, Mr. Zeigler. I don't have any other questions.

CHAIRMAN FRANCIS: KCAB?

MR. LEE: Thank you, Mr. Chairman. We have no questions. Thank you.

CHAIRMAN FRANCIS: Korean Air?

CAPT. KIM: No questions, sir. Thank you very much.

CHAIRMAN FRANCIS: Barton ATC?

MR. E. MONTGOMERY: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Boeing Company?

MR. DARCY: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: Guam?

MR. DERVISH: No questions, Mr. Chairman.

CHAIRMAN FRANCIS: NATCA?

MR. MOTE: No questions, Mr. Chairman. Thank you.

CHAIRMAN FRANCIS: Mr. Donner, sir?

MR. DONNER: No questions, sir.

CHAIRMAN FRANCIS: Greg?

MR. FEITH: Yes, sir. I do have some questions. And I am going to beg your pardon, Mr. Chairman. I know that you were talking about not having any redundant questions but I just want to make sure that I have the picture.

Mr. Zeigler, in brief terms, what do you do as a POI or as a -- international geographic inspector as far as oversight is concerned? I heard you say that you don't do en routes, you don't have to review

manuals, you don't approve training programs. You do take some sort of violation action when there is a violation that occurs. Given the number of airlines that you were overseeing, what is it in the broad sense that you focus in on to take corrective action on a 129 operator?

THE WITNESS: Well, of course, the first thing that we do on all the carriers is try to maintain their op specs up-to-date. Whenever they make changes either in aircraft or places that they're -- they want to go, they're supposed to submit changes to us and we have to keep their op specs updated.

They're -- as I mentioned, the inspections that we do are set forth in our annual work program, and we are required by our annual work program, the NPG, to do a station facility inspection, a trip records inspection, a ramp inspection, and depending on the airport, a de-icing inspection if it's one of those that's located in the northern part of the country for each airport within the U.S. that that airline operates to.

MR. FEITH: Okay. Now, you -- and this is where I got confused because you told Captain Misencik that you don't get their manuals and the updates to their manuals, yet you -- you do track their op specs,

so you -- you're getting that on a recurrent basis to understand when the changes are coming down the line in their op specs, is that correct?

THE WITNESS: I don't follow you there.

MR. FEITH: You said that you don't -- you don't have any manuals from the carrier that you're responsible for.

THE WITNESS: That's correct.

MR. FEITH: But you do track the op specs and changes to their op specs.

THE WITNESS: We -- we maintain the op specs in our office.

MR. FEITH: Okay. With that in mind, how are these changes communicated?

THE WITNESS: Well, the airline if they wish to make any changes, such as adding an airport or taking an airport away or if they buy three new airplanes and they want to add those aircraft, they must let us know. They send a copy -- their blank op specs pages which we give to each airline, and they fill out these new pages and send them to us in duplicate. And we review it and we either approve it or maybe we find some mistakes and send it back to 'em. But in any case, once it's approved then it goes into their file.

MR. FEITH: Okay. Let me -- let me just digress a little bit because, again, I got confused with the communication. You said you don't communicate on a regular basis with your counterpart in the foreign government.

THE WITNESS: That's correct. These -- what we're talking about on op specs is back and forth between us and the airline.

MR. FEITH: Okay. Now, if there is a problem with the op spec, do you deal directly with the airline or you --

THE WITNESS: Yes, sir.

MR. FEITH: Okay.

THE WITNESS: With the airline.

MR. FEITH: And that resolution is directly with the airline. How about your counterpart? Is there ever an interface with your counterpart, your foreign counterpart in the --

THE WITNESS: No, sir.

MR. FEITH: Should there be?

THE WITNESS: Might not be a bad idea.

MR. FEITH: Do you have a -- an assistant POI that assists you? I -- I -- I see that you were responsible for one, two, three -- about eight airlines prior to your reassignment with the -- the current

carriers that you have, but at the time of the accident you had about eight airlines. Do you have an assistant that helps you with all of these airlines?

THE WITNESS: No, sir.

MR. FEITH: How much time do you spend with each of these carriers or overseeing each of these carriers?

THE WITNESS: With each one?

MR. FEITH: Uh huh.

THE WITNESS: An awful lot of time, believe me.

MR. FEITH: Is there enough time in your day to oversee all of these carriers?

THE WITNESS: Well, again, our -- our ramp inspection, our work program, all the inspections that we're required to do by our work program only take up supposedly a certain percentage of our time, so we do have other things to do. But we accomplish as a rule 100 percent of our work program every year.

MR. FEITH: But you're only one person looking at nine different airlines.

THE WITNESS: Yes, sir. In some of these inspections at -- at other out-stations are done by other inspectors at -- at those stations. However, we try at our office to make an effort for each airline

that we're assigned to do an inspection at each and every facility that they come into. In the case of Korean Airlines, because they came into so many different places in the United States, there was just simply no way I was ever going to have time to go around to all of 'em.

MR. FEITH: Do you need a PO -- an assistant?

THE WITNESS: Do I need an assistant?

MR. FEITH: Yeah.

THE WITNESS: Well, it wouldn't be bad, but where our staffing level is, that's -- there's no way that's going to happen.

MR. FEITH: Do you think that because of that staffing level that there might be a compromise to the oversight of 129 operators into the United States?

THE WITNESS: I don't think so because, again, we have offices scattered throughout and -- and wherever the airline goes we can always call upon inspectors in those offices to go do these inspections for us.

(Pause)

MR. FEITH: If the chairman will allow me, I'll pass to the Board of Inquiry while I sort out the rest of my questions real quick.

CHAIRMAN FRANCIS: All right. Pat?

MR. CARISEO: I -- I have a couple questions. Why are -- why are you no longer involved in inspecting Korean Airlines?

THE WITNESS: Well, as I said earlier, sir, we had a new inspector come into the office so we rearranged all the airlines. And what we were trying to do is instead of having so many different airlines in different countries, we tried to put them all with one -- you know, from one country with one inspector. And since we had this new inspector come in we just redivided all the airlines up. It had nothing to do with Korean being Korean or anything else. I just ended up with the three Chinese airlines and two Japanese airlines.

MR. CARISEO: Does this other inspector have a similar workload that you do?

THE WITNESS: Yes, sir. He does. All inspectors in our office do.

MR. CARISEO: You had mentioned that you would probably like an assistant. Is -- have you expressed your desire to your higher-ups that maybe you need some additional resources?

THE WITNESS: I think they're well aware that we need additional resources, sir.

MR. CARISEO: And what has their answer been?

THE WITNESS: They're trying to get the people, but --

MR. CARISEO: Thank you.

MR. BERMAN: Mr. Zeigler, you're the principal geographic inspector assigned to Korean Air?

THE WITNESS: Not now. I was.

MR. BERMAN: You were, --

THE WITNESS: Yes.

MR. BERMAN: -- sorry.

As such, when you were doing that, did you receive any assistance from other geographic inspectors elsewhere in the United States?

THE WITNESS: Oh, yes, sir.

MR. BERMAN: How did they report their findings to you?

THE WITNESS: By either fax or through the PTRS system.

MR. BERMAN: How often did you review the PTRS findings from Korean Air?

THE WITNESS: Every time we had anything come into the office for any given airline it was delivered -- on the upload/download it was delivered to the inspector responsible.

MR. BERMAN: Have you ever had a finding from PTRS that was -- caused you to take further action?

THE WITNESS: Would you repeat that?

MR. BERMAN: Have you ever had a finding through the PTRS from another geographic inspector that caused you to take further action on Korean Air?

THE WITNESS: Yes, sir. At least one or two occasions I received PTRS reports from other inspectors and forwarded them both to the KCAB and the Korean Airlines.

MR. BERMAN: Was there ever a P -- a PTRS --

THE WITNESS: And -- and in -- in the case of Korean Airlines themselves, they did respond to me.

MR. BERMAN: Was there every any input from other geographic inspectors about non-compliance with clearances?

THE WITNESS: I don't -- I'm sorry. What?

MR. BERMAN: Was there ever any PTRS or other input from other parts of the country on Korean Air about non-compliance with air traffic control clearances?

THE WITNESS: Oh, with air traffic control? No, sir.

MR. BERMAN: Okay. Did you ever get out to Guam to inspect station or conduct ramp -- ramp

inspections?

THE WITNESS: Yes, sir.

MR. BERMAN: When was your last visit to Guam?

THE WITNESS: I was on Guam I believe it was in May or June of '97.

MR. BERMAN: Inspecting Korean Air?

THE WITNESS: Korean Air, Asiana, All Nipon, all the carriers that -- the foreign carriers that came in there.

MR. BERMAN: Did you observe flight operations --

THE WITNESS: Yes, sir.

MR. BERMAN: -- approaches and departures?

Does the FAA classify foreign air carriers as to their compliance with Federal regulations or as to their ability to operate in the United States?

THE WITNESS: Not that I'm aware of, sir.

MR. BERMAN: They don't classify them as class one, two, or three?

THE WITNESS: Not the airlines, no, sir.

MR. BERMAN: Do they classify the foreign -- they classify the foreign civil aviation bureaus, that's right.

THE WITNESS: Yes, sir. Under the assessment program.

MR. BERMAN: Did any of the carriers that you oversee or have overseen operate in countries that were classified below class one?

THE WITNESS: Yes, sir.

MR. BERMAN: When -- when you are in that situation, do you take any other or different actions as far as your oversight of that air carrier?

THE WITNESS: Well, on those that are from category two countries we do increase surveillance on them.

MR. BERMAN: What do you do?

THE WITNESS: More and more inspections, more thorough inspections.

MR. BERMAN: What would be a more thorough inspection?

THE WITNESS: We try to get really nitpicking with them.

MR. BERMAN: Can you give me an example?

THE WITNESS: Well, on a ramp inspection normally the -- if you were to take the ramp inspection form, it calls to you to inspect a considerable number of items. Generally speaking, you do not have the time on any given ramp inspection to literally hit every one

of those items because usually the aircraft's only going to be there for an hour. And if you went through everything on there it might take two or three hours.

So, in the case of one of these that -- that we really wanted to take a hard look, we may end up delaying the departure in order to hit some of the other items that we wouldn't ordinarily do on a routine ramp.

MR. BERMAN: So you -- you do a more thorough ramp inspection, but do you ever get further into the manuals or the flight procedures of those airlines?

THE WITNESS: No, sir, because we don't have any -- any approval authority over the manuals.

MR. BERMAN: Have you ever grounded an airplane during one of your ramp inspections?

(Pause)

THE WITNESS: Temporarily, yes, sir.

MR. BERMAN: And have you ever grounded a Korean Air airplane?

THE WITNESS: No. No, sir.

MR. BERMAN: Okay. No further questions.

CHAIRMAN FRANCIS: Mr. Feith, are you --

MR. FEITH: I just have a couple --

CHAIRMAN FRANCIS: -- reorganized?

MR. FEITH: Yes, sir. I just have a few follow-up questions after listening to Mr. Zeigler.

As Mr. Berman was just asking about your ramp inspections and doing more thorough inspections and you had mentioned that you may in fact delay a flight or temporarily ground an airplane, are there any political ramifications if you in -- if you do delay a flight or ground an airplane?

THE WITNESS: Well, there could be, I suppose.

MR. FEITH: Have you ever --

THE WITNESS: Well, I --

MR. FEITH: -- felt those ramifications?

THE WITNESS: -- you know, the few delays that we've caused have been relatively minor. I'm talking a matter of an extra 15 to 30 minutes. And usually there are other things that are delaying their departure anyway.

MR. FEITH: So you don't --

THE WITNESS: Clearances or whatever.

MR. FEITH: So you don't get any feedback from above?

THE WITNESS: No, sir.

MR. FEITH: As far as corrective action on the PTRSs, you had said that on PTRS findings those

PTRS findings are submitted to the KCAB or to the other foreign authority and to the airline. How do you know if corrective action has been taken?

THE WITNESS: Well, when I sent a copy of it to the airline, I asked them to tell me what action they had taken, and then they responded and they told me what they had done.

MR. FEITH: What if the action isn't satisfactory to you?

THE WITNESS: Then we could write 'em another letter and -- and tell 'em that it wasn't satisfactory and we need that they do something else.

MR. FEITH: Do you ever have a problem with having corrective actions taken on PTRS findings --

THE WITNESS: No, sir.

MR. FEITH: -- that are made?

I have no further questions.

CHAIRMAN FRANCIS: Mr. Berman mentioned the assessment program and the categorization of -- of authorities worldwide. It's a program that's been going on now for six or seven years. It's a very important program. It's one that's expanding. IKO's taking over leadership of this program. And as -- as we can see here, there are some very serious constraints in terms of the 129 Program. Hopefully,

and I think already we're seeing the assessment program and the way that it's being run leading to -- to some serious and -- and significant improvements in -- in aviation safety around the world. So I -- I think that that's something that the FAA started a number of years ago and for which they deserve some credit. It's also very much helping to deal with some of the issues that we've talked about here today.

I believe that's the end of the day. We will reconvene here at 9:00 tomorrow morning. And enjoy your evening in Hawaii.

(Whereupon, the proceedings were adjourned, to reconvene at 9:00 a.m., Wednesday, March 25, 1998.)